AMERICAN GAS JOURNAL

JULY, 1937

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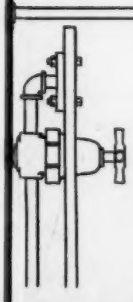
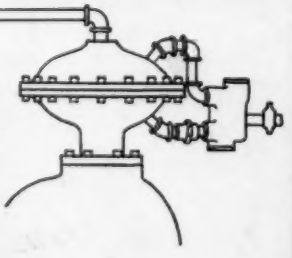
EMCO

Pilot Loading REGULATORS



Progressive gas companies are now using "switchboard control" for dispatching gas—a method made possible through EMCO's advances in pressure regulation. Complete and accurate control, within ounces, for the high pressure distribution mains illustrated above, is obtained through the use of the EMCO Pilot Loading System. The Pilot Loading Regulators, located at the control panel, accurately govern the loading pressure on the main regulator diaphragms and permit the outlet pressures at the main regulators to be varied by finger-tip control from this central point.

The EMCO Pilot Loading System is fully described in our Bulletin No. 1006. Write for your copy.



PITTSBURGH EQUITABLE METER CO.

MERCO NORDSTROM VALVE CO.

MAIN OFFICES PITTSBURGH, PA.

ATLANTA BUFFALO CHICAGO MEMPHIS

NEW YORK COLUMBIA KANSAS CITY PHILADELPHIA TULSA HOUSTON LOS ANGELES OAKLAND

In Two Parts—Part I

THEN . . .

The same long-lived material

A CENTURY AGO
—A cast iron gas main which has been in service in Boston for more than 100 years.

and NOW

but with modern mechanical joints

TODAY—A recent installation of mechanical joint cast iron pipe for high pressure gas service.

The gas industry is one of the few which has used, in a vital service, the same material for more than 100 years. Modern operating conditions have required the development of a bottle-tight mechanical joint but cast iron pipe itself remains the same enduring and economical material, fundamentally unchanged. Mechanical joint pipe is available in diameters from 1¼ to 84 inches.

CAST IRON PIPE

THE STANDARD MATERIAL FOR UNDERGROUND MAINS

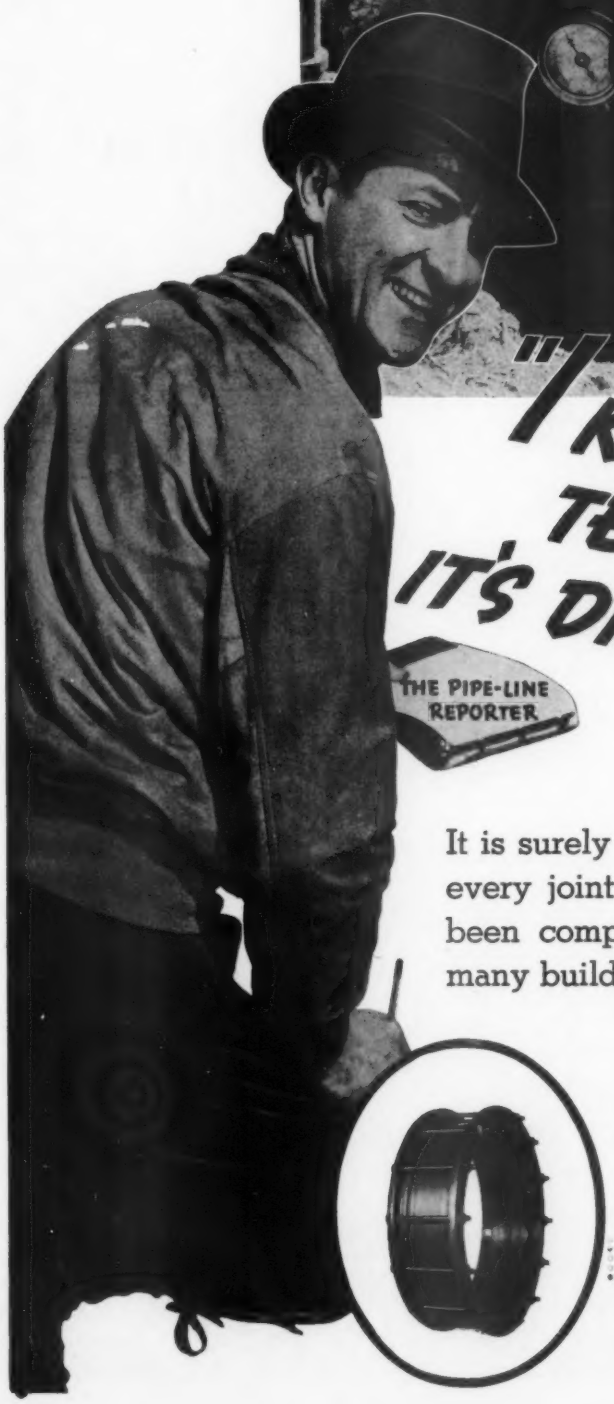
TRADEMARK REG.

The Cast Iron Pipe Research Ass'n, Thos. F. Wolfe, Research Engr., 1013 Peoples Gas Bldg., Chicago

AMERICAN GAS JOURNAL, July, 1937. Vol. 147, No. 1. Published monthly by American Gas Journal, Inc., at 34 North Crystal St., East Stroudsburg, Pa. Executive and Editorial offices at 53 Park Place, New York, N. Y. Entered as second-class matter, October 7, 1928, at the post office at East Stroudsburg, Pa., under the Act of March 3, 1879.

Note to Reader

This is the fourth in a series of advertisements dramatizing one engineer's experience with his first Dresser-coupled line. For the complete story, write for Bulletin No. 351.



"I KNEW IT WOULD TEST TIGHT — IT'S DRESSER-COUPLED"

It is surely gratifying to have a new line test tight in every joint . . . especially when the line has already been completely backfilled, as is the practice with many builders of Dresser-coupled lines. • But, testing tight is only part of the Dresser story. Permanent tightness is an even greater advantage. This time-proved, Dresser advantage precludes those "unaccounted-for" losses that are often so troublesome and costly.

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MFG. COMPANY, BRADFORD, PA.
In Canada: Dresser Mfg. Company, Ltd., 60 Front Street, West, Toronto, Ontario

SUPERIOR

Diaphragms
Provers
Repairs
Service Cleaners
Gas Meters

SUPERIOR METER CO.
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167 - 41st Street

KEEP THE HOME FIRES BURNING *with Clean Gas*

● An investment in Blaw-Knox Gas Cleaners is an investment in freedom from service complaints.

● It insures continuity of service and customer satisfaction, all dividend payers.

BLAW-KNOX COMPANY
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BLAW-KNOX GAS CLEANERS

BLAW-KNOX

SIT DOWN AND LIST YOUR OFFICE NEEDS

Mail coupon today for complete information. Let Remington Rand supply the office equipment you need. Hundreds of items always in stock, each the latest and best of its kind. Many important and exclusive improvements within the past two years. A complete range of prices to fit the specific job. Deliveries in most cases can be made overnight from nearby warehouse points.

Enjoy the savings that result from large scale operations. Benefit from the invaluable experience Remington Rand has gained in supplying utilities all over the country.

Phone the Remington Rand man in your city or mail the coupon for complete details and description of the items in which you are interested.

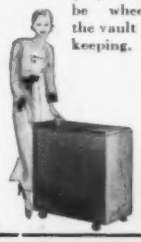
SAFE-FILE
for irreplaceable papers

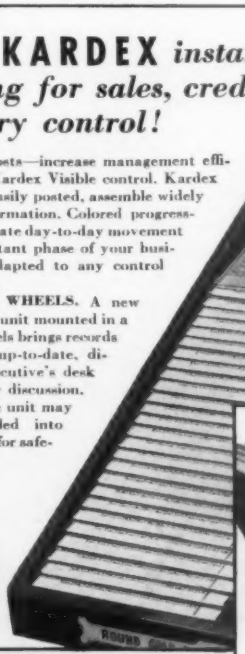
Your most valued paper assets are safe for one hour with Safe-File. Each drawer is a separate insulated compartment. Considered standard equipment for law offices, banks, utilities and places of business where loss of records would mean serious financial loss or delay in resuming operations.

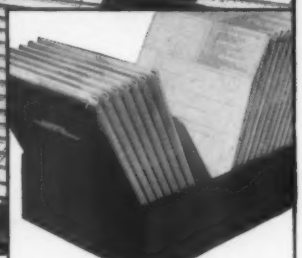
Visible KARDEX *instant signaling for sales, credit, inventory control!*

Cut business costs—increase management efficiency—with Kardex Visible control. Kardex Visible cards, easily posted, assemble widely distributed information. Colored progressive signals indicate day-to-day movement of every important phase of your business. Easily adapted to any control system desired.

KARDEX ON WHEELS. A new Kardex Visible unit mounted in a cabinet on wheels brings records complete and up-to-date, direct to the executive's desk for dictation or discussion. At night, entire unit may be wheeled into the vault for safekeeping.







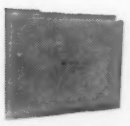
KARDEX *book unit*

No business too small for Kardex Visible control. New zipper book unit, brief case size, holds Kardex cards. Also used for executive summary control makes unique visual presentation.

KARDEX VERTICAL VISIBLE

Brings to records the advantages of vertical filing plus visible signal control and finding speed. One glance picks out the account you want. A brilliant colored signal flashes its status, prevents error. On ledgers, speeds up collections.

Every-Day Supplies For Every Office At New Low Prices

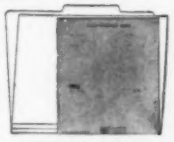


FILE FOLDERS

Manila, kraft, pressboard—with plain, reinforced metal or celluloid tabs.

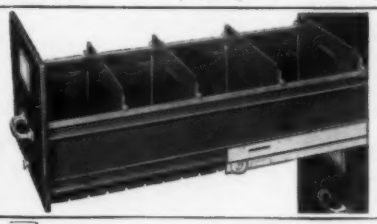
CHARGING SYSTEMS

Simple inexpensive forms to charge out-of-file papers to individuals, preventing loss.



CROSS REFERENCE SHEETS

Standard forms to indicate material filed under another classification.



FLEXIBLOCKS *save file space*

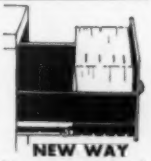
Eliminate space consuming followers. Adjustable along channels at bottom of drawer, holds papers upright for quick and easy reference. For use in all types of Remington Rand files.

OLD WAY

100 folders—10 papers each—use 13" of filing space.

ECONOMY FASTENERS

Kompakt Fasteners, a new invention for heavy duty, save 25 to 60% space of ordinary fasteners. Make a flat neat folder with no rough edges to catch adjacent papers or folders. Scottie Fasteners are most economical for light duty.



NEW WAY

Same material with Kompakt Fasteners need only 7".

MAIL COUPON NOW

Remington Rand Inc. Dept. U-47
465 Washington Street, Buffalo, N. Y.

Please send me complete details on the items checked. ☐ Safe-File; ☐ Visible Kardex; ☐ Kardex Book Unit; ☐ Kardex Vertical Visible ☐ Kardex on Wheels; ☐ File Folders; ☐ Charging Systems; ☐ Cross Reference Sheets; ☐ Flexiblocks; ☐ Economy Fasteners.

Name.....

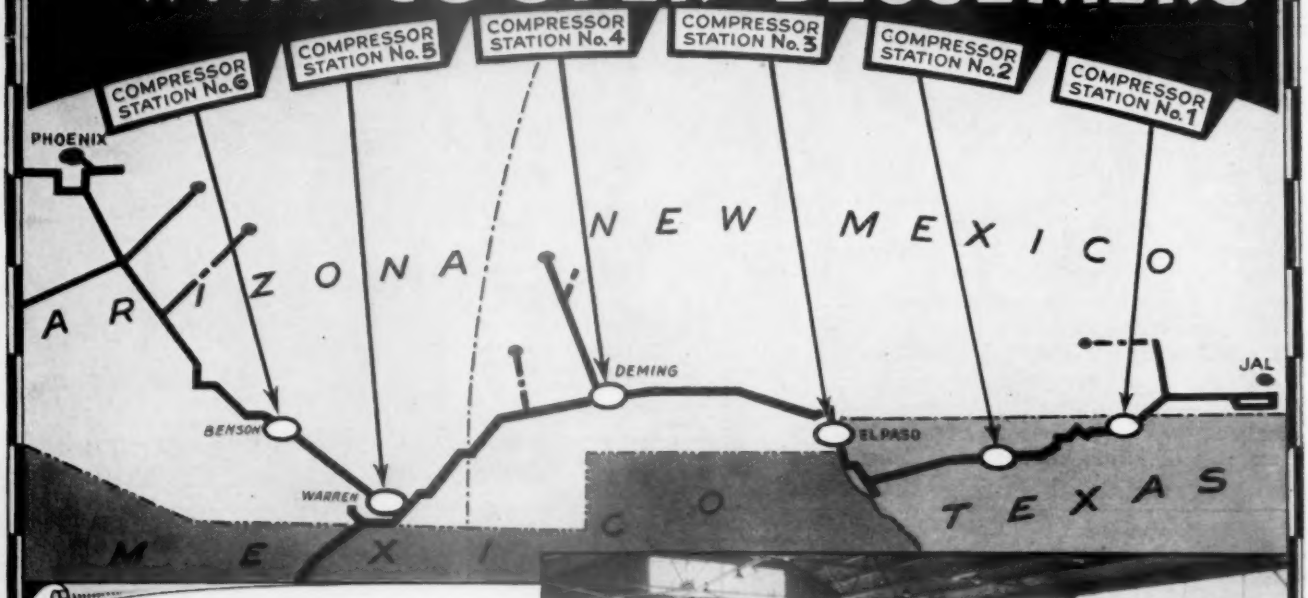
Firm.....

Street Address.....

City..... State.....

Ok..it's from Remington Rand

Another NETWORK SPREADS ACROSS THE MAP ---WITH COOPER-BESSEMERS



Map above shows pipe lines in operation--EL PASO NATURAL GAS CO. and Subsidiaries.

Twin-tandem compressor units--like those shown at the right--power the six compressor stations, indicated.

« « El Paso Natural Gas Company's network--with its start in the Jal, New Mexico, field--crosses three states and extends into Mexico. The system is constantly extending and branching, and Cooper-Bessemer compressor units are being used exclusively.

« « And so, "El Paso" is another prominent utility that puts its whole faith in slow-speed, heavy-duty units--Cooper-Bessemers!

THE COOPER-BESSEMER CORPORATION

Mt. Vernon, Ohio — PLANTS — Grove City, Pennsylvania

15 West 43rd Street, New York City | Mills Building, Washington, D. C. | 640 East 61st Street, Los Angeles, Calif. | 201 East 1st Street, Tulsa, Oklahoma | 631 Spring Street, Shreveport, La. | Magnolia Building, Dallas, Texas | Esperson Building, Houston, Texas

JUL 20 1937

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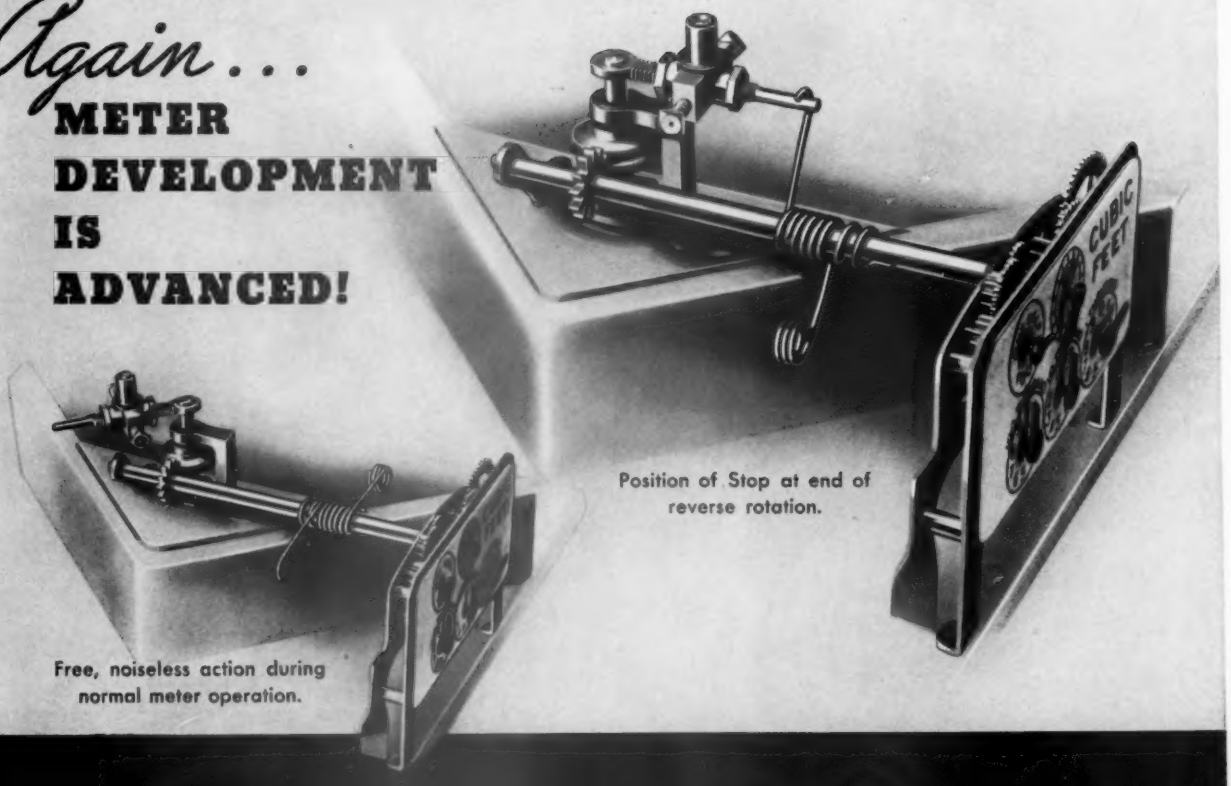
Again...

METER DEVELOPMENT IS ADVANCED!



Position of Stop at end of reverse rotation.

Free, noiseless action during normal meter operation.

THE AMERICAN *Silent Reverse Stop*

● An ingenious new invention that provides absolute safety . . . not only as an anti-tampering device, but as a sure safeguard—where back pressure occurs—against damage to flag arms or strain on other meter parts. By simple adjustment, it permits the meter to run backward for 50 or more revolutions! ● One spiral unit is fixed permanently on the index axle. The other revolves freely . . . and silently . . . thereon, during normal operation. During reverse rotation of the meter, the movable spiral works back toward the tangent—until the hook finally engages the tangent bar. A feature introduced into new AMERICAN Tinned Steelcase Meters that can also be applied to meters brought in for repair. Complete information supplied promptly on request.

ESTABLISHED 1836

AMERICAN METER COMPANY

INCORPORATED

GENERAL OFFICES: 60 EAST 42ND STREET, NEW YORK, N. Y.

865

JULY
1937

AMERICAN
GAS JOURNAL

VOLUME 147
No. 1

Water Heaters are Sold in Terms of Hot Water Service

By
J. M. Yerdick

I HAD not been working as a salesman for the Central Appliance Company a week before I began to clearly realize just where my opportunities lay.

I knew that the boys who were driving away at ranges were finding certain difficulties in the way of making sales in spite of the fact that they were making sales. I knew that most homes in the region had ranges of one kind or another, and that while the market for the newer type ranges was broadening month by month as the old models became obsolete, there were still obstacles to be overcome which might discourage the novice.

On the other hand, in gas heaters I saw a situation that appealed to me at once. In the first place, even in my limited number of contacts on home heaters I found out that surprisingly few homes had adequate heaters in the district, that the average householder was amazingly ignorant of just what the modern gas heater will do, how it does it, and the low cost of operating it. I found an intense interest in the subject of plenty of hot water at the turn of the faucet, and something to talk about that had a swell sales ring in it.

As a rule, the gas range appeals mostly to the woman of the house who does the cooking. The rest of the family have little enough traffic with it. But every one in the average household has a vital personal interest in hot water.

In this article Mr. Yerdick who recently took over the sales of Domestic Gas Burning Appliances gives his idea on how Domestic Water Heating should be sold. Doubtless many of our readers will concur with his point of view.—Ed.

Dad wants hot water for shaving, sister and brother want hot water for the bath, and mother for washing and for many other purposes. Here was a chance to get what we salesmen learn to term "concurrence." That's a thing that salesmen must always get in greater or less degree when they are selling the family.

Interest—and Lack of It

Now, it seemed to me that in selling a specialty like a water heater, I would meet less difficulty in getting this necessary concurrence from the various members of the family than I might in plugging ranges. Let the veterans sell all the ranges, pocket their bigger commissions per sale. I would study this whole heater proposition and make myself a specialist in hot water heaters. Having worked out in this field, I could then turn to other domestic gas appliances and broaden my activities.

A brief experience revealed to my mind several important facts.

One was that the *last* thing in the world to talk about when you are out selling heaters is the heater itself. I don't think any one ever wanted to buy a water heater nor to have it in the house. Of course, a man or woman takes a certain pride in having a modern, beautiful and up to date range.

The range is the glory of the kitchen. It is seen not only by the family each day but it is seen by friends and callers very often. But the heater works with considerable anonymity, seldom meets the eye of outsiders, and seldom is seen by the members of the family itself.

So that, I began immediately to base my approaches and sales talks on the delights, comforts and conveniences of old man hot water.

And did I rouse immediate interest!

Give me a home where reliance is placed on the furnace water box or the coal range water box, or the coal or trash fired heater, with limited and uncertain quantities of hot water, and where hot water was something every one must, as a rule, wait a while to get—and I can make plenty of hot water as joyous a topic of conversation as a new automobile in a prize contest!

Selling Heaters

Now, fully aware that every one in the family has a direct and personal interest in the hot water supply, I found that evenings offered the very best period in which to call with my hot water story.

I always contrive to make the real sales canvass after supper, and by appointment. Once I have mother, father, daughter and son—and even grandma together, and knowing previously that they *have* more or less of a hot water problem, I've got my factors all in one boat and am able to shoot the works in terms they can easily understand.

I deliberately present myself, not as a water heater salesman but as one whose business it is to show each member of the family how they may easily have all the hot water they want when they want it, as much as they want, and at small cost. At once I am a friend, and fellow to be reckoned with. It is amazing how much you can say about the mere subject of hot water in the American home without getting tiresome.

One of the problems of the home specialty salesman today is to interest each person in the family who may be directly or remotely interested in the article you have to sell, since a single sour note may, and often does, stymie a sale. So, after I have gotten each one enthused on the subject of plenty of hot water, when and as needed, I am ready to reveal to them just how this most desirable objective is to be achieved. But, even at this advanced stage, I seldom try to demonstrate the heater itself. No one wants to buy a heater, as said before, and the best plan is to gradually work into the subject of heaters, and to explain why the gas heater is so superior.

EVERY AGE NEEDS HOT WATER
● A quick velvet smooth hot water shave is the way to start each day.
● When cleaning is to be done there must be plenty of hot water. Go GAS for Hot Water.
● New Hours of freedom appear miraculously when you go GAS for hot water for dishwashing.
FLAKES
● For a pick-up before an evening's gaiety or summons of the sandman there's nothing like a hot bath.
● Cold water baths make babies cry. Start cleanliness habits early with warm baths.
GO GAS
FOR HOT WATER
No longer is it necessary to limit your Hot Water Needs with a Stop and Go hot water supply. Under our new plan you may have a Ruud Automatic GAS water heater installed in your home for as little as $2.35 and you may pay the balance in equal monthly payments. Go GAS for Hot Water.
ILLINOIS POWER AND LIGHT CORPORATION

This 4 column newspaper advertisement illustrates the sales angle of this article. The convenience of ample hot water for all household purposes is well set forth.

Putting It In

I am perfectly willing to show pictures of the various heaters we sell at this point, making light of the heaters as mere mechanical contrivances designed to do a certain job. But, if the prospects insist, I am willing to go into more detail from the catalog and printed matter. Or, I am willing to make an appointment for a store demonstration, but always belittling the contrivance itself and keeping to the fore the idea of plenty of hot water as the main topic of conversation and the objective of our meeting.

It so happens that our outfit is perfectly willing to put heaters in under certain restrictions and conditions, and I have put a number in without the buyer ever having laid eyes on it until all connections were made and the heater was delivering the hot water bargained for.

Once you get a good gas heater working for the whole family, I cannot imagine a situation arising where they would let you take it out again. That is, they certainly would not let you deprive them of the hot water they all want. And that is because in my canvass I have not sold heaters as heaters. I have sold a solution of the hot water problems to each member of the family from his personal and individual standpoint. To most of my customers I am not the water heater man . . . I am the hot water man.

Now, selling on this basis it is quite natural that I should uncover good prospects for ranges and other appliances. I do,—regularly.

But I have made hot water the important thing I have to sell. It is one of the greatest door openers any appliance salesman could possibly have if he uses it properly. If he can forget gas heaters and concentrate on what every member of the family really wants—plenty of hot water as and when wanted, he strikes the keynote of sales success.

The Panhandle Field and Conservation of Natural Gas

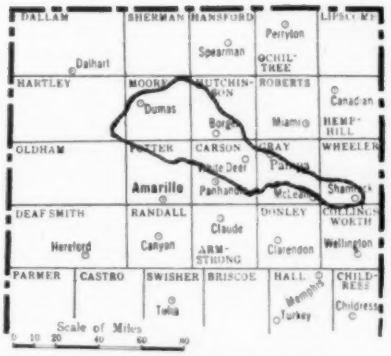
By C. Emery Troxel
Assistant Professor of Economics
Wayne University

THE nation's greatest natural gas field, the Amarillo or Panhandle field of Texas, was first discovered in December, 1918, when oil prospectors brought in a gas well with 5,000,000 cubic feet of daily capacity. During the next two years other wildcatters found more of this dry gas for which there was no market. The Gulf Production Company in 1921 drilled an oil well with the insignificant daily capacity of 175 barrels. But until 1925, when a 200-barrel well was brought in, there was scarcely any drilling in this field. All these gas wells had been capped and left as wildcatting failures. Soon, however, the oil industry was excited by the discovery of a 3,000-barrel gusher. Then the Lone Star Gas Company extended a 200-mile pipe line to the Panhandle because its gas supply in the Petrolia field was nearly exhausted.

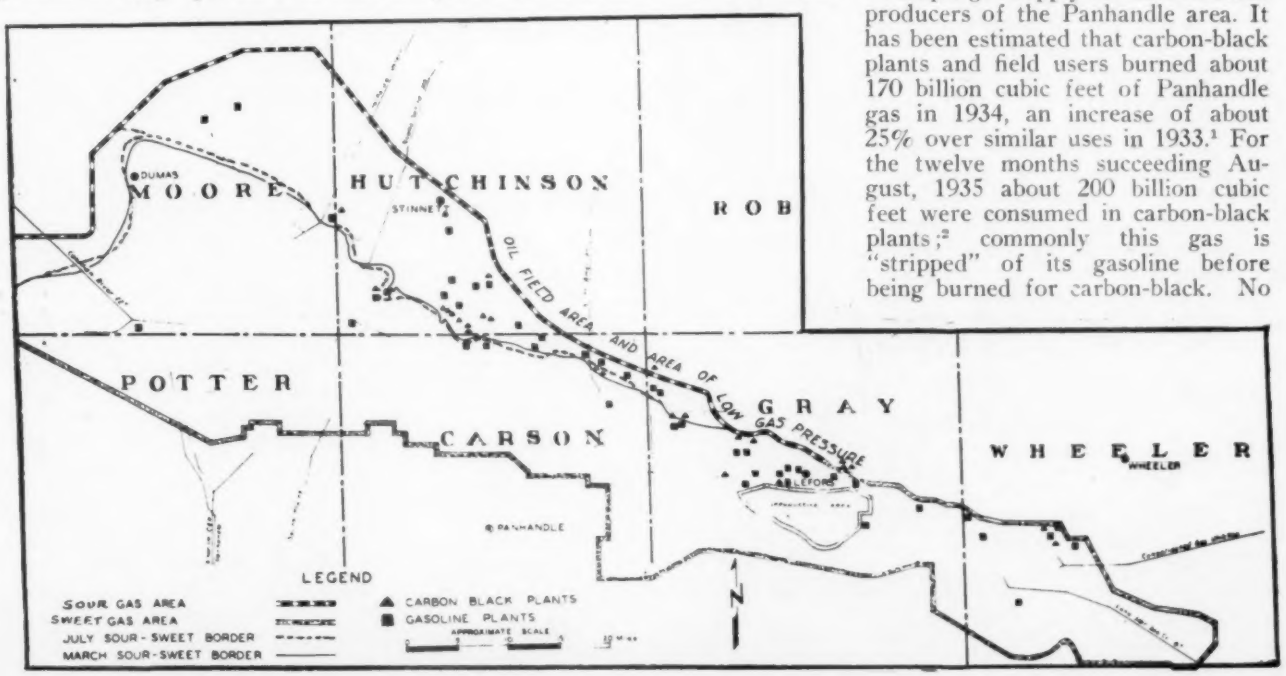
Today this gas field is a 100 or 125-mile uplift which stretches westward from the Oklahoma border through eight Texas counties. At present the proven area of the field covers approximately 1,500 square miles. Usually the gas is found at a depth of 1,600 to 2,400 feet under present average pressure of about 350 pounds; in 1936 about ½ of the acreage had 400 or more pounds of gas pressure. The gas is dry and sweet with the exception of about one-third of the field (the northern and Western edges) which contains oil and sour (sulphurous) gas. In addition to technological improvements in gas pipe lines, the tremendous gas reserve of this field has encouraged since 1927 the construction of thousands of miles of pipe line.

Source of Carbon-Black

The carbon-black industry, because it must be in constant search of a cheap gas supply, gradually migrated from West Virginia through Louisiana to Texas where it is now well intrenched. Roughly four-fifths of the nation's annual carbon-black supply is produced there, the center of the industry being in the Panhandle field. Since only one to one and one-half pounds of carbon-black are produced per thousand cubic feet of gas (only a fraction of the total carbon content), and since the price of carbon-black is now about four cents per pound in the field, it is apparent that, after operating expenses have been deducted, gas must be available at a low or "dump" price—usually less than one cent per M.c.f. And in the absence of public service markets for the gas produced and with the liberality of Texas' gas conservation laws, there has been an ample gas supply for carbon-black producers of the Panhandle area. It has been estimated that carbon-black plants and field users burned about 170 billion cubic feet of Panhandle gas in 1934, an increase of about 25% over similar uses in 1933.[1] For the twelve months succeeding August, 1935 about 200 billion cubic feet were consumed in carbon-black plants;[2] commonly this gas is "stripped" of its gasoline before being burned for carbon-black. No



The above map of the Panhandle Section of Texas shows the general location of the Panhandle Gas Field. The charts which follow have been furnished through the courtesy of the Railroad Commission of Texas, Oil and Gas Division.—Ed.

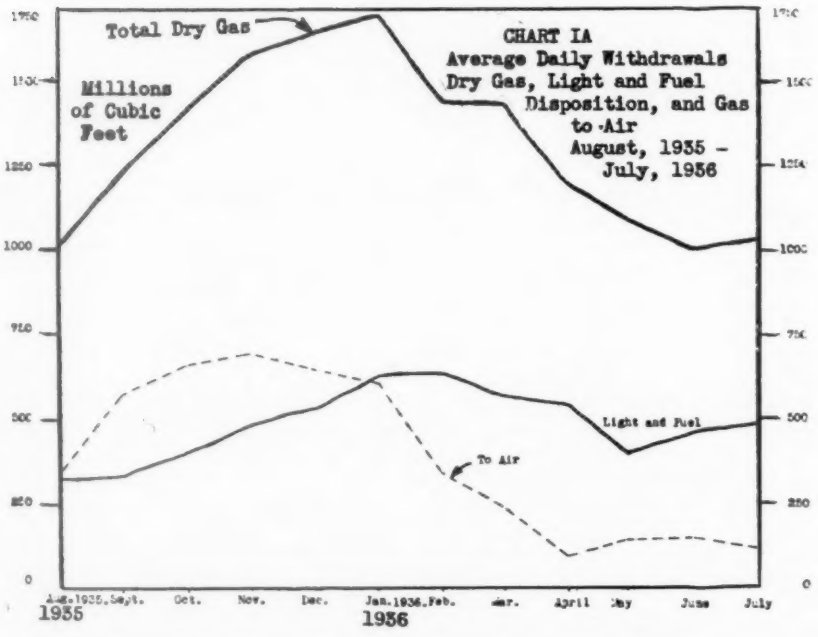


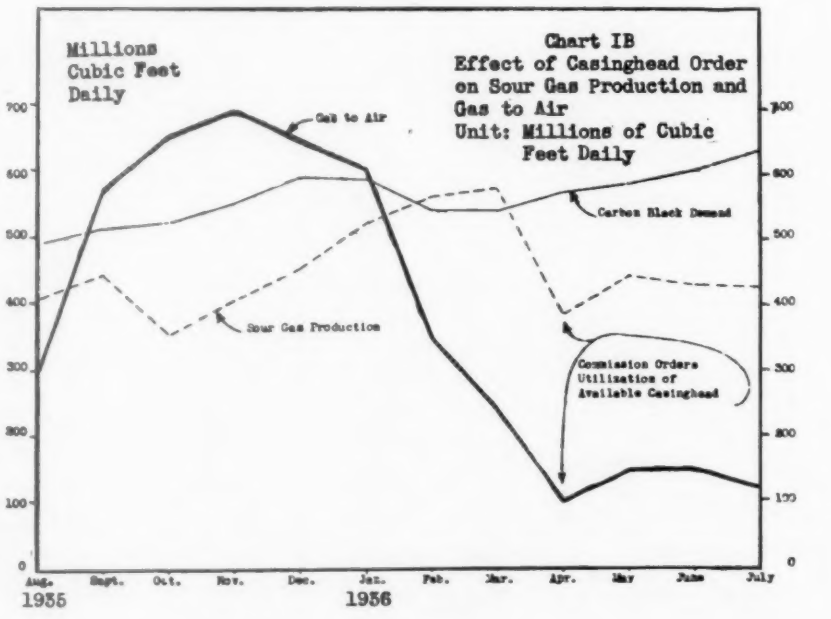
curtailment of carbon-black manufacture has been reported, even though legislation in 1935 forbade carbon-black manufacture from sweet gas.

Gas Wastage

Although an average of about four-tenths gallon is obtained per M.c.f of gas, wasteful "stripping" of natural gasoline and the blowing to the air of the remaining gas, i. e., the portion which is not delivered to pipe lines or carbon-black plants, reached a critical point in the Texas Panhandle in 1933 and 1934. During 1933 in the Panhandle 44.9% of the gas delivered to natural gasoline plants was wasted.[3] In 1934, 73.5% of the gas produced in this field was delivered to natural gasoline plants; these plants wasted 61.5% of the amount received or 41.2% of the production of the entire field. By the first half of 1936 —legislation enacted in 1935 and which will be described later limits gas wastage—69.7% of the produced gas was taken by gasoline plants but these plants were blowing only 31.3% of it to the air.[4]

The percentage of waste to the total gas production increased from 45.7 in 1933 to 55.1 in 1934. In the first six months of 1936 about 22% was wasted; in July, 1936 the wastage as reported by the Texas Railroad Commission had declined to 7.9% of total production. The proration order under the 1935 law was made effective on December 11, 1935. Some of this waste was in the oil-producing sections of the field: Panhandle oil producers often waste from 50,000 to three million cubic feet of gas to obtain one barrel of oil. Finally, only about 150 billion cubic feet of gas in 1934 and about 200 billion cubic feet in 1936 was taken by the pipe lines. During 1934 the amount of gas blown into the air in the Amarillo field was over three times as great as the deliveries to pipe lines. At the 1934 rate of gas production the Panhandle field, with an estimated reserve of ten trillion cubic feet of gas,[5] might have lasted for 12 to 15 years: this inexcusable waste of gas was rapidly depleting the field. Fortunately, the recently enacted legislation has reduced this waste. If this sheer waste will continue to be reduced by





existing legislation, the Panhandle field would have an approximate life of 25 years on the basis of 1936 rate of production. If Panhandle gas were used at the 1936 rate of pipe line purchases—if, in short, all sheer waste as well as field and carbon-black uses were eliminated—this Texas field might produce gas for 50 to 70 years. In 1935 the Bureau of Mines estimated on the basis of rock pressure decline that one-third of the original Panhandle reserve had been withdrawn.

Market Adjustment

Underlying the critical problem of gas waste in the Texas Panhandle during the last few years is the division of the well operators into two groups: first, those who have contracts to sell gas to the long-distance pipe lines and the corporate systems which control about 60% of the total proven acerage; and, second, the independent operators. The independents without pipe line connections control about 20% of the sweet gas acreage. The one group of operators has a market, whereas the other group is left to choose between wasteful use of gas or idleness of their wells and undeveloped acreage. In the event that the independent operators close their wells, the operators with pipe-line outlets have the entire field for their sole use and

[1] U. S. Bureau of Mines, *Mineral Market Reports*, No. M.M.S. 346.
[2] Railroad Commission of Texas, *Report on the Panhandle Oil and Gas Fields*, July, 1936.
[3] Texas Railroad Commission, *Report of Supervisor of Panhandle District*, 1933.
[4] Same as note 2.
[5] In 1935 Cotner and Crum (U. S. Bureau of Mines) reported an original reserve of 13.7 trillion cubic feet for 900,000 acres of about 1,400,000 proven acres in the Panhandle.

may drain supplies from beneath the land of the independents. On the other hand, all the legislative attempts to make pipe line companies purchase independents' gas did not attempt to limit drilling by independents. Under these circumstances, perchance, the independents could charge again after they drilled more wells that pipe line companies ought to purchase more gas from independents.

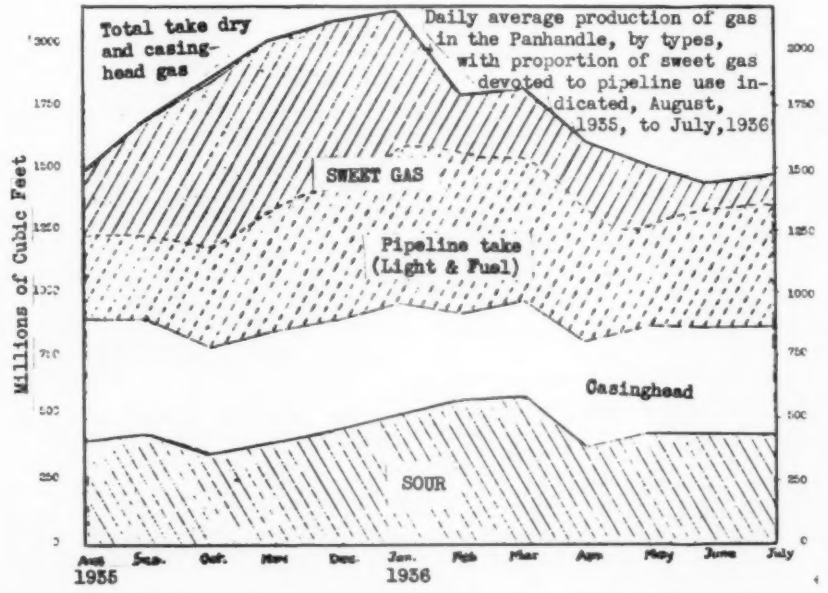
In 1931, as a remedy for this problem, the state of Texas passed its "Common Purchaser Act" which required that a gas pipe line purchase ratably from all the gas producers of the field served by it.[6] Restriction of additional well-drilling, however, was not included as part of this conservation measure. Pipe lines protested against the bill as being ". . . too burdensome to permit compliance." Naturally pipe line companies desired to take gas from their own wells or from well owners with whom they had contracts. A Federal District Court permanently enjoined the enforcement of this act.[7]

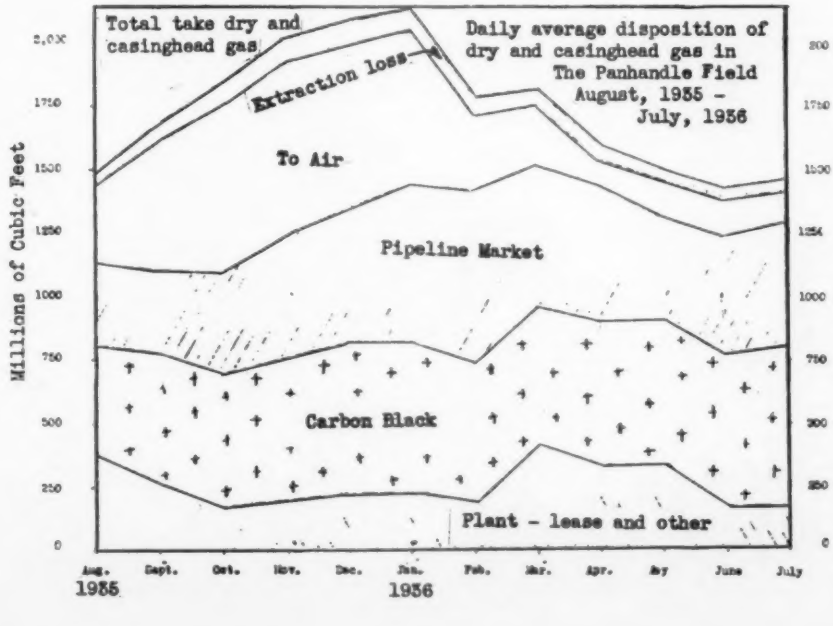
A second effort, this made by the Texas Railroad Commission, to reduce the waste was also blocked. The Commission ordered a production shut-down in a defined area, and the production of other areas was reduced to 4% of the open flow.[8] The Texas legislature next passed the "Market Demand" law, that permitted the Commission to determine the allowable gas production for each well operator in the event the production from a common source was in excess of "market demands."[9] Similarly, this law was invalidated after the Texas Commission had ordered and prorated a maximum daily production of 300,000,000 cubic feet of gas in the Panhandle field.[10]

[6] *Vernon's Annotated Civil Statutes of Texas*, 6049a. Several southwestern and western states have enacted similar statutes.

[7] *Texoma Natural Gas Co. v. Railroad Commission*, 59 Fed. (2d) 750, (June 8, 1932).

[8] *Texoma Natural Gas Co. v. Terrell*, 2 F. Supp. 168 (1932).


Total take dry and casing-head gas
Daily average production of gas in the Panhandle, by types, with proportion of sweet gas devoted to pipeline use indicated, August, 1935, to July, 1936
SWEET GAS
Pipeline take (Light & Fuel)
Casinghead
SOUR
Millions of Cubic Feet
1935
1936


Total take dry and casinghead gas
Extraction loss
To Air
Daily average disposition of dry and casinghead gas in The Panhandle Field August, 1935 - July, 1936
Pipeline Market
Carbon Black
Plant - lease and other
Millions of Cubic Feet
1935
1936

The "Sour Gas Law"

Having failed in these attempts to conserve the gas produced by the independent operators and acting on the theory that the pipe line interests were solely responsible for the conflict, the Texas Legislature in 1933 passed the "Sour Gas Law".[11] Under this law the owner of a gas well might use 25% of the capacity of the well for the manufacture of natural gasoline, when there was no market for light or fuel usage. Thus, large amounts of gas were blown into the air after the gasoline had been extracted. This law permitted the above-described tremendous waste of gas in the Texas Panhandle, thereby endangering the gas reserves for the long-distance pipe lines. This law and its goal are remindful of Charles Lamb's often mentioned tale of burning houses to roast pigs.

On May 1, 1935, Governor Allred signed a measure which is designed to eliminate some of this gas waste in Texas. Aroused Texans and public utility interests (see their pamphlet titled "Texas' Greatest Crime") obtained the passage of this bill which in gas fields provides for proration of gas production to prevent waste and to adjust "correlative rights and opportunities of each owner of gas in a common reservoir," for prohibition of the waste of gas by natural gasoline "stripping" plants after October 1, 1935, and for prohibition of carbon-black production except from sour gas.[12] In prorating the gas production allowance of a field the following data are considered: formation pressure, open-flow capacity, size of the lease, well's structural location, and porosity of the formation. If the gas-oil ratio of an oil well does not exceed 10,000 to 1, the gas may be wasted, although any oil well "shall be allowed to produce daily a total volume of gas equivalent to that of any other well producing from the same common source within the limits set by

[9] *Vernon's Annotated Civil Statutes of Texas*, 6049c, Sec. 8.

[10] *Canadian River Gas Co. v. Terrell*, 4 F. Supp. 222, (1933).

[11] *General and Special Laws of Texas*, 43d. Leg., 1st Sess., 1933.

[12] *General and Special Laws of Texas*, 44th Leg., v. 1, ch. 120.

the Commission." Thus, if one well is producing 200 barrels of oil with a gas-oil ratio of 10,000 to 1, other oil well-owners will be permitted to waste 2,000,000 cu. ft. of gas daily regardless of their oil production. Consequently, this law permits large gas wastage in the oil-producing sections of the field. If, however, a well has a gas-oil ratio of 100,000 to 1, it will be classed as a gas well.

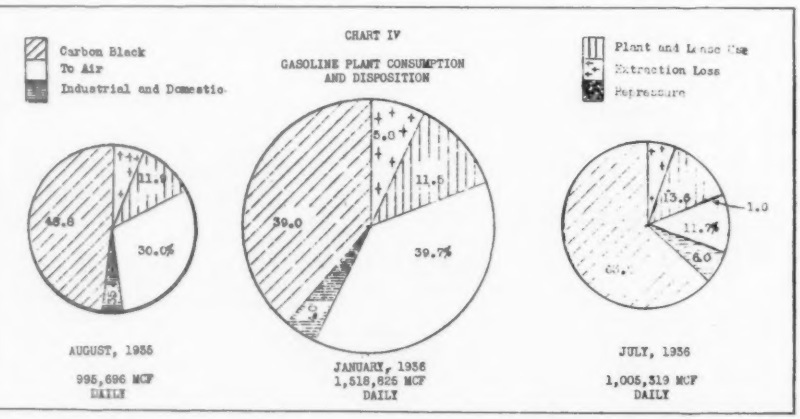
Regulation of Curtailment

After a United States District Court had upheld the regulation of carbon-black production provisions and had granted a temporary injunction against the proration order that had been issued under the foregoing law,[13] the cases were taken to the United States Supreme Court. Respecting the proration order of December 11, 1935 which would force pipe line companies to purchase gas from independents, the Supreme Court affirmed the lower court's opinion.[14] No protection, observed Mr. Justice Brandeis, was to be found under common law for the independents' proportion of a common supply of gas. Believing that the pipe line companies had sustained the burden of proving that they had not contributed to the gas waste, the Court concluded that a bill based upon prevention of waste could not be invoked against them. Because ". . . use of the pipe line owner's wells and reserves is curtailed solely for the benefit of other private well owners," the Court could think of ". . . no more glaring instance of the taking of one man's property and giving it to another." Nor would the Court consider the claim of the Texas Commission that the pipe line companies had promised to accede to proration of gas production if the "Sour Gas Law" were repealed.

Despite the carbon-black company's claim that the sweet gas will migrate to the lower-pressure sour gas sections of the field, the Supreme Court found no "arbitrary exercise of legislative power" in the State's prohibition of carbon-black manufacture from sweet gas.[15] Answering the charge of discrimination in determining uses of sweet gas, the Court concluded that "for the carbon-black plants in the Panhandle field the sour gas there affords an ample supply."

While there is probably no serious question to be raised on restricting carbon-black manufacture, the Supreme Court's other opinion on Panhandle gas regulations does seem to leave all independent gas producers with or without pipe line connections at the mercy of the pipe line companies. In a sense it is a buyers market; the pipe line companies at their pleasure may take or leave independents' gas. But this condition is no excuse for wasting gas! Indeed, the Supreme Court said, "We assume . . . that the state may constitutionally prorate production in order to prevent undue drainage of gas from the reserves of well owners lacking pipe line connections."[16] It seems unfair, moreover, to place the entire burden of rectification of this unsettled condition upon the pipe line owners. It should be reiterated that none of the above Texas laws provided for control of well-drilling by either independents or pipe line owners. And possibility of return to the "Sour Gas Law," a condition which would be ruinous to the vital gas reserve of pipe line companies, should, perhaps, induce accession by pipe line owners to more carefully framed laws than the foregoing legislation; it probably would be a long-run saving for them. Possibly solution of this problem awaits more complete control, if indeed this may be done, of the pool's acreage by the pipe line owners.

[13] *The Henderson Co. v. Thompson*, 14 F. Supp. 328 (1936); *Consolidated Gas Utilities Corp. v. Thompson*. 14 F. Supp. 318 (1936).
[14] *Thompson v. Consolidated Gas Utilities Corp.*, 57 Sup. Ct. Rep. 364, Feb. 1, 1937.
[15] *The Henderson Co. v. Thompson*, —U. S.—, Mar. 1, 1937.
[16] Same as note 14.



Conflict of Oil Production and Gas Conservation

Everyone knows that most of the gas produced in association with oil is wasted. The competitive and highly individualistic nature of our oil industry usually prompts an excited recovery of only oil from the oil-gas solution. But no state has been willing to stifle its oil industry that gas may be conserved for future use, because employment, business activity, and tax revenues would fall sharply were oil production in some states to be reduced substantially. When the pool is controlled by a single group or several friendly groups, however, an effort may be made to conserve or sell the gas. In dry gas fields or where the gas-oil ratio is high, there should be no pardon for flagrant waste or misuse of natural gas. To prevent the over-development of a field—often this condition leads to wasteful practices—well-drilling should be more stringently controlled. Carbon-black producers, furthermore, should be required to extract a higher percentage of the carbon content of gas, even though the market price of carbon-black, as a result, might rise. In short, state agencies should enforce the powers they possess to prohibit sheer waste or wasteful utilization of gas. Voluntary unit production agreements, such as exist in the Kettleman Hills field, might solve these difficulties; but conflicting interests and bickerings of numerous land and leasehold owners thwart their general acceptance. Proration has been applied in recent years to reduce the supply of oil or gas thereby increasing oil prices rather than to conserve gas or oil.

Governmental agencies, as well as oil and gas producers, should be challenged to conserve the nation's irreplaceable natural gas supply, which has been and is being wasted in the Panhandle and elsewhere.

Accident Reduction In Fleet Operation

By

Fred E. Kunkel

The author brings to light an interesting analysis of the underlying causes of accidents in fleet operation. The driver of apparent normal intelligence and good appearance sometimes showed a low order of mentality under a psychological examination such as the "Morgan" test. This accident-prone feature prevailed even when the individual was transferred to another department.—Ed.

"WE thought accidents were matters of chance, the weather, car condition, etc.," explained the superintendent of a gas company recently interviewed, "but after thorough investigation we found that a certain group of men contributed each year about fifty percent of the accidents.

"Take a group of fifty drivers with thirty accidents a year. We found that the men who drove the greatest mileage didn't necessarily have the most accidents. Speed was found not to be a factor. Neither governors nor other traffic devices stopped accidents. Whether pleasure car or truck, the record was the same.

"As our studies progressed we saw no hope for controlling accidents with some outside pressure such as speed reduction or teaching them to drive carefully, or inflicting penalties. No matter what form our efforts took, our record did not indicate any chance of changing the accident-prone driver.

Classification of Accidents

"As a base for obtaining a record we started with accidents reportable to an insurance company, and we did not classify other accidents. The question came up whether a man should be charged with accidents in which he was not driving, and the contention by the men and the supervisor was that his record should not be charged with any accident which occurred while the car was in a stop position.

"But we found that the same men were having accidents either in parking, or after having parked, or by being bumped into the rear by stopping suddenly and unexpectedly. So we decided to classify them as accidents too and charging the men with them. We found that these accident prone men did not use good judgment as to whether to park near a busy corner instead of a side street, or parking double in the most impossible places, and if they came to a sudden stop, they never used an arm signal, and they always took chances in stopping the car in plenty of time with their brakes, with the result that a rear end collision was inevitable. Their judgment just wasn't there.

"We also found that the mechanical condition of the car was not a factor in accidents in its operation. We didn't find any difference in moving a man from an old car to a new car. There was absolutely no change in improvement in that man's accident rate.

Conflicting Claims as to Cause

"The big point was how should it be corrected? We soon found that you cannot educate that man into having fewer accidents. In the first place you cannot tell what caused the accident. You can read hundreds of accident reports in an insurance company office and talk to the men afterwards. You can limit your investigation to your own group and the result is the same. Regardless of a man's honesty, he naturally reports the accident in the most favorable light. You cannot take an accident report and believe it. One man will only see a portion of it. Psychology is a peculiar thing. It is intangible, unreliable. One man has his version, and the man with whom he was involved in an accident has still another version. The two stories never agree. And in all these cases we made no attempt whatever to place the blame. We couldn't.

"You can talk about reckless driving and speed, and all that, but until you have given a lot of thought to a definition of what constitutes reckless driving, it looks easy. That is the real trouble, finding the exact definition. It can't be done. Only one thing you can say is that some one does not drive the way you would. Speed has nothing to do with it. You cannot find any one who can really define reckless driving. You cannot legislate it. The only thing I know of that has any value is the plan used in Rhode Island. After a man has a certain number of accidents he is not permitted to drive any more on the public highways.

Speed or Equipment Not Responsible

"And so we came to the conclusion that it was not a question of reduction of speed, or of brake inspection, or of weather conditions, nothing at all except the unsafe driving by a man who is not fit to drive. So we began looking for accident frequency. We took a group of accident-prone drivers and attempted a prediction. Accidents were plotted in one direction and time in another. And we could soon definitely predict when that driver would have his third, fifth or seventh accident. It was generally a straight line. The startling thing about this graph was the striking accuracy with which these predictions came true. Only occasionally did we find a man who deviated from this law of expectation. The study turned out not only to be true but it was exceeded. And from that time on we began to look to men rather than equipment or the factors surrounding the accident.

Rewards and Penalties Ineffective

"Having discovered that it was the men who caused the accidents and not the equipment or road hazards, we made certain efforts to censure the men and to inflict such penalties as giving them a job they didn't like to do for a couple of days or a week, or laying them off. Not a financial penalty to be paid to us, but demoting them for two weeks or a month. Then we also tried to reward them for careful driving, but we could not change the total number of accidents.

"This reward idea is interesting. For a good month without accidents

we awarded $1 to each driver, $2 for the next month and so on. But we soon found out that the only thing we were doing was to pay the good drivers more money, whereas it had no effect on the poor drivers at all.

"Having tried educational methods, penalties and rewards, and found them all wanting, we next tried to find something in the men that would account for their accident prone condition. We took five of them to the department of psychology of a nearby university for mental examination. Four out of the five had averaged four major accidents a year.

Low Mentality Underlying Cause

"The tests made at the university showed that they were definitely feeble minded and had the intelligence of an eight-year-old boy. The fifth man had intelligence but he had trouble with his vision which could not be corrected by glasses. After these findings we had openings for five more men. And it was the only sound basis by which we were able to affect that accident rate. Thus we got rid of those who contributed fifty percent of the accidents year after year. We replaced these accident prone men with drivers who met the test and then transferred accident prone drivers to other types of work.

"This again proved a mistake. That didn't pay either. We found that men prone to have accidents on the road should not be transferred elsewhere because this proneness carried right over into personal injury. We found he substituted personal injury accidents in lieu of traffic accidents. In fact, one of the men driving his own car was involved in an accident later that cost two lives. Another met with accidental death in his own machine.

"What happens to men when transferred from traffic to non-driving jobs? They have accidents just the same. It is not the fault of the individual really, but something he cannot control. The thing that causes it is an unconscious thing. He is not morally responsible. Nor can he be cured. The only thing that will cure the accident rate in the plant or on the road is the elimination of the man who is accident prone. You cannot place the blame on him—it is not a moral thing at all. The man is not to blame for something he cannot help.

Psychological Test Reveals Mental Status

"The intelligence test used by the university takes about thirty minutes. It is frequently called the Morgan test. It asks simple questions. And the answers to what appear to be very simple questions is amazing. For instance, 'the sun rises in the ..... and sets in the .....' These accident prone drivers answered that question any number of ways. It showed them to be boys of low mentality. It was the greatest shock of our lives when we checked into their relatively low grade mentality. Yet we tested them in our own way in casual conversation and couldn't detect anything wrong with them. Certainly there was nothing wrong with their appearance. You could not tell by looking at them or talking with them. They were nicely dressed and looked bright enough. Their conversation was normal and apparently intelligent.

"Since we made this shift as a result of this test, we have reduced our accidents 43% in the first six months."

A.G.A. Executive Conference Adopts Resolutions Unanimously on May 29th

RESOLVED: That the thanks of the Conference is richly due to the Committee on Program, and especially to the discussion leaders who devoted so much time and thought to their contributions to the welfare of the industry.

IT IS FURTHER RESOLVED: That the American Gas Association and the executives of the member companies foster and develop and put into effect at once detailed plans and sales effort to promote increased domestic load in cooking, water heating, refrigeration, and house heating, along the following lines:

1. Advertising and Publicity, both local and national, to demonstrate to the public the greatly increased efficiency and utility of the gas range in competition with other fuels, and to make them mass conscious of the value of gas for such purposes.
2. Concentrated sales effort to introduce modern gas ranges not only for new homes but for replacement purposes as well.
3. Completion and continuation of organization on modern kitchen planning and cooperation with architects and builders on a local and national basis.
4. Development of refrigeration sales to a greater extent than ever before.
5. Development of water heating plans and improvement in application and design of all types of water heaters to meet all conditions.
6. Further development of house heating equipment and air conditioning with the thought in mind of reducing the cost of the equipment to the customer and its application to broaden markets.
7. That prompt efforts be made to analyze competing fuels, costs and supply and equipment with a view of putting the industry in a better position to meet such competition as it arises.
8. To keep up unremitting efforts to make not only the public but the industry itself have confidence that gas is still, and always will be, the modern fuel for domestic, commercial and industrial fuel purposes.
9. That a committee be appointed to coordinate the above promotional activities of the Association and to stimulate greater support of the national advertising campaign among all branches of the industry so that its coverage shall be broadened along the same policies now in effect.

New York World's Fair Progress

Contracts for lots for three exhibit buildings to be erected at the New York World's Fair, 1939, are announced by Grover Whalen, president of the Fair Corporation.

The American Gas Association has signed a contract for 122,008 square feet of ground in the Community Interests Zone of the Fair. The plot is located directly behind the Fair-built Hall of Community Interests, where the focal exhibit for the zone will be housed.

According to Alexander Forward, managing director of the Association, the gas industry will erect a building harmonizing with the general architectural scheme of the Fair in which will be shown exhibits of modern gas cooking, refrigeration, water heating and air conditioning appliances for the American home. A central theme display will be incorporated in the exhibit depicting the important part that gas plays in providing better living.

Details as to plan and construction are being developed by a committee headed by H. H. Cuthrell, vice president of the Brooklyn Union Gas Company, and will be announced in the near future.

According to company officials, Consolidated Edison plans to erect a building to house an exhibit for the promotion of its electric, gas and steam services through interesting and dramatic demonstrations of the advantages of these services in the modern home and business.

Gas Exhibits, Inc. Organized for N. Y. World's Fair

The Gas Exhibits, Inc., was organized on June 25th to conduct the gas industries exhibit at the New York World's Fair in 1939. The following officers of the new corporation were elected: President, H. H. Cuthrell, vice president of Brooklyn Union Gas Co.; Vice President, W. T. Rasch, president of American Gas Products Corp.; Secretary, C. W. Berghorn, executive secretary, Assn. of Gas Appliance and Equipment Manufacturers; Treasurer, N. T. Sellman, vice-president, Consolidated Edison Co.

The gas industries contemplate spending a million dollars in this activity.

Review of New Higher Court Gas Rate Decisions

By Leo T. Parker

Attorney at Law
Cincinnati, Ohio

RECENTLY several readers have expressed interest in late and leading higher court decisions, involving gas rates under new and modern conditions. Therefore, the purpose of this article is to review all higher court decisions rendered during the past several months, not in detail but concisely with only the most important points of the law stated, and starting with those cases reported May, 1937.

In view of the vast amount of research necessarily employed in collecting the hereinafter data it behooves gas company and municipal officials, executives, department and traffic managers, and employees to retain these important records for future reference.

Validity of Gas Rate Laws

First, it is important to know that the authority to regulate rates charged by gas companies is a power residing primarily in the state. Therefore, no city, or subdivision of the state, can exercise such power unless it is authorized to do so by the state laws. If the State Legislature has not conferred that power upon cities of a special class, then an ordinance regulating the rates to be charged for gas is invalid. Still another important point of the law is that a gas company's charter may give it a right to charge stipulated rates, but this does not prevent a city council from enforcing reasonable rates authorized by the state statutes. (See Kentucky v. Maysville, 36 F. (2nd) 816.)

From this explanation it is readily apparent that municipalities have no *inherent or natural* powers to enact valid ordinances, but derive the authority from the state statutes, and the same law is applicable with respect to conpanies' charters. Also, the courts have held that city ordinances properly and legally enacted are to be *strictly* construed. In other words, any fair or reasonable doubt as to the existence of the power of a municipality to pass an ordinance will be resolved *against* the municipality.

Still another important point of the established law, decided by the higher courts, is that a state statute is invalid if it violates the United States or State Constitutions; or, if it violates United States Statutes, or, if it is unreasonably restrictive; or, if its enforcement especially is disadvantageous to the public.

A city ordinance is void if it violates the United States or State Constitutions, or United States Statutes; or, if it violates a provision in the municipal charter; or, if it contradicts a State Statute; or, if it is unnecessarily restrictive; or, if it is against public policy and unlikely to promote and protect the public health, morals and welfare of the general public; or, if it favors a particular class of business corporations, firms or individuals.

Franchise Provision

Before entering into the review of newest higher court gas rate cases, it is appropriate to state that although a municipality may not have previously fixed gas rates yet, if it has power to grant a gas franchise, a clause in the franchise is valid by which the city reserves the right to fix the rates. And although the rates are unreasonably low the court may decide in favor of the city unless the fixed rates are confiscating.

In one United States court case (32 F. (2nd) 338) it was disclosed that a municipality granted a gas franchise which contained a clause by which the city reserved the right to fix the gas rates. The franchise contained another clause that if the gas company should be dissatisfied with the rates thus fixed, it may resort to the courts.

After the city granted the franchise its council enacted an ordinance establishing gas rates so low that the gas company immediately instituted suit and requested the court to grant an injunction to prevent enforcement of the new rate ordinance. The counsel for the gas company contended that the rates were unreasonably low, but failed to prove that such rates were confiscatory. Therefore, the court held the ordinance valid, saying:

"It may be that those rates are unreasonable and confiscatory, and yet the ordinance does not deprive plaintiff (gas company) of its property without due process of the law. To hold that it does is to ignore the provisions of the ordinance granting its franchise which contemplated and provided that the board of councilmen of the city should enact an ordinance prescribing rates . . . Here the ordinance complained of was enacted under, and in pursuance to, granting plaintiff (gas company) its franchise, which it had accepted . . . That ordinance contemplated and provided that the board of councilmen of the city should promptly enact an ordinance prescribing rates. It is true that it called for the prescription of reasonable rates. But the meaning was that the board should prescribe rates which it deemed reasonable without hearing or investigation . . . As the rates to be charged could have been fixed in the franchise, so it would seem that the power to fix them by a subsequent ordinance reserved in the ordinance granting the franchise would be valid."

Obviously, the final legal effect of any law, ordinance, regulation, charter or franchise provision depends upon its interpretation or construction by the courts. It is well established that the object of the courts is to interpret the intent of the ones who formulated it, and to construe the intent of the people who adopted it. Generally speaking, intent is found in the instrument itself. In fact when the text of a provision is not ambiguous, the courts in construing it are not at

liberty to search for its meaning beyond the instrument itself.

When construing an instrument of the above classes, in order to correctly interpret the true thought or meaning, the first consideration of the court is the natural signification, or order of the arrangement of the clauses. If the words of the clause being construed convey definite meaning, which involves no contradiction of other parts of the instrument, then that meaning which is apparent is accepted.

Another important point is that it is never presumed that a provision or clause was inserted in a constitution, statue, or ordinance, regulation, charter, or franchise without good reason, or that a result was intended by its framers inconsistent with the judgment of men of common sense. (288 Ill. 327.)

The courts recognize that the people are superior to any instrument, and they are subject to it while it is in force, but they are possessed of the legal and common law right to change, alter, or amend it at their own will in any of the regular ways provided by constitution or laws, if it is against public policy. (178 Ind. 336.)

On the other hand, it must be remembered that unless an instrument is against public policy, which means that it is so detrimental to the general public that its enforcement would likely prove disastrous, the parties thereto cannot refuse to be bound by it, or avoid responsibility for failure to fulfill the obligations, although something happens which makes it impossible or highly disadvantageous to one or more of the parties to proceed in strict accordance with the provisions of the instrument.

There are many reasons and situations which entitle gas companies to apply for and receive an increase of rates charged for gas. These reasons will not be enumerated but, in the cases hereinafter listed, it is assured that each gas company, municipality or the Public Utilities Commission had a valid reason for re-establishing the rates.

New Decisions

As was held in Arkansas-Louisiana Gas Company v. City of Texarkana, 17 Supp. 447, the courts cannot determine whether a gas rate, fixed by rate-regulating body, is confiscatory by comparing such rate with what other courts consider or have decided to be reasonable rates. In establishing the rates, the "going concern" value of a gas company is properly allowed. Also, the management service rendered by an affiliated company is operating expense for rate purposes, where there is substantial evidence that such service has value to the gas company. And allowance should be made for "depletion," or wasting assets, and for "depreciation," or wear and tear incident to use of the property.

In making allowance for depreciation for gas rate-making purposes, distinction was made between amount allowed for observable depreciation and amount placed in depreciation reserve. The court held this to be proper.

As to depreciation of cast iron pipe, the depreciation allowance of five per cent of the value of distributive system was reduced to two per cent, as pipe was cast iron with service life which was estimated at from 75 to 100 years. With respect to income tax, this court held that the expense allowance should include, for rate-making purposes, only that amount of income tax which would be payable after the company has taken advantage of every deduction from gross income allowed by law. As to leakage an allowance of ten per cent was held proper where the leakage could be held to ten per cent by exercise of ordinary care. This court held that the gas rate fixed by a city council is not subject to molestation, unless so low as to result in taking of private property for public use without just compensation and in violation to constitution provisions.

In Cary v. Corporation Commission of Oklahoma, 17 F. Supp. 772, the United States Court held that a return of seven per cent to a small natural gas company whose gas field would soon be exhausted, necessitating heavy expenditures to develop a new gas supply, was proper.

In Peoples Gas Light & Coke Company v. Slattery, 5 N. E. (2nd) 285, the court held that a gas company was not entitled to a temporary injunction restraining a Public Utilities Commission from reducing gas rates after the Commission had entered an order suspending the increased rates and the company was not given consideration of its request to put into effect the increased rates pending final determination of reasonableness of such rates. This company was making an annual net profit of more than 3 percent on its own estimated value, and it appeared that its profits were increasing.

In 15 F. Supp. 171 the court held a city ordinance valid which prescribed certain characteristics for gas and gas service, under police power of the city, where the testimony was ample to support the claim of the city council that the service without the characteristics prescribed was unsatisfactory and unsafe.

In 2 N. E. (2nd) 540 a city passed an ordinance reducing the gas rates. The court held that the increased rate fixed by the Public Utilities Commission which increased the rate over that prescribed by the city ordinance was not unreasonable in consideration of the investment and expenses of the company and, therefore, valid.

In 1 N. E. (2nd) 489, the court held that the cost of the annual franchise payments by a gas company to city was properly required to be borne by the company's consumers residing within city. Therefore, this court held the Public Utilities Commission's order valid which authorized the company to increase its rates to city consumers to defray the cost of franchise payments made to the city.

In 85 S. W. (2nd) 870 a consumer of gas filed suit to compel a gas company to reduce its rates. The court held that the consumer was without any vested rights that precluded the city and the gas company, holding a city franchise, from effecting reasonable adjustment of controversy over gas rates.

In 89 S. W. (2nd) 1004 the present gas rate does not yield the company 7 per cent return on its property and investment. The company filed suit when the Public Utilities Commission lowered the rate, but the higher court held that this evidence did prove that the lower rate would not yield a reasonable return on the property. In view of abnormality of the present condition, the lack of actual test under lower rate, and inclusion of doubtful items in property valuation upon which return was computed, the lower rate was held valid.

In 182 Atl. 94, the court held valid an order of the Public Service Commission fixing future rates to be charged by a gas company, although it contained a schedule of rates for preceding six years during which the Commission had been considering the controversy over the rates.

In 88 S. W. (2nd) 627 the court held that a Public Utilities Commission may require a gas company engaged in producing, transporting, distributing, and selling gas to keep books segregating various phases of its business, and to charge each phase with expenses incurred, so that any other phase of its business may be properly regulated and controlled by public officials or others authorized by law to do so.

The Manufacture of Industrial and Domestic Gases by Means of Electricity

(Complete Gasification of Coal with Oxygen)

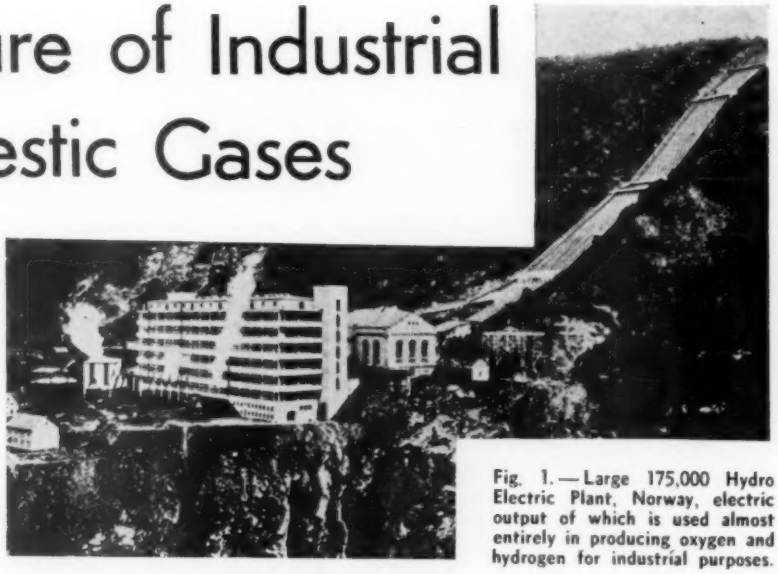


Fig. 1.—Large 175,000 Hydro Electric Plant, Norway, electric output of which is used almost entirely in producing oxygen and hydrogen for industrial purposes.

By A. T. Stuart

Director, Electrolytic Gas Department, Hydro Electric Power Commission of Ontario, Leaside, Ont.

WHEREVER gas is available in large quantities at low cost, as in the natural gas areas of the United States or in those areas of the United States reached by some 50,000 miles of pipe lines, gas becomes a principal fuel for industrial and domestic purposes. Probably no better evidence than this is needed to show that gas is an ideal form of fuel for many purposes.

In regions where natural gas is not available it is obviously important to investigate means for the manufacture of gas at low cost. We know that the cost of heat in bituminous coal is equivalent to natural gas at about only 15c per 1000 cu. ft. and to manufactured gas at about only 7.5c. The difficulty has been to convert coal to gas at low cost.

For many years it has been known and realized by experts in all parts of the world that the solution of the problem of the economical and complete conversion of coal into gas will depend upon large supplies of cheap oxygen. Air contains about 21% ovygen and air is the one and only raw material which comes to us automatically and without any cost whatever. It has been natural therefore for experts all over the world to look to air as the logical source for cheap oxygen. It is possible that this is where a mistake has been made because, in 50 years of research, no one has yet been able to procure cheap oxygen from air in moderate quantities at low costs.

One of the purposes of this paper is to show that, in some locations and circumstances, air is not the logical source of cheap oxygen but that water is the more logical source. One gallon of water weighing 10 lbs contains 8.88 lbs. of oxygen and 1.11 lbs. of hydrogen and these two gases can be separated in the highest purity by utilizing surplus generator capacity at any central electric station, whether operated by fuel or water power, or by utilizing continuous 24 hour water power under certain favorable circumstances. A good example of the utilization of 24 hour water power is that of the 175,000 H.P. hydraulic plant in Norway which has substituted power lines by pipe lines conducting away from the power house some 10,000,000,000 cu. ft. per year of hydrogen and oxygen. Two-thirds of this volume of gas is hydrogen which is required for fertilizer manufacture and 3,333,000,000 cu. ft. of oxygen are produced as a by-product at no cost whatever. This is but one example of about a dozen water power plants operated in such a manner that pure oxygen is produced in immense volumes at no cost even when primary power is used. (Fig. 1.)

Modern fuel-fired power stations are able to produce surplus kilowatt hours at costs varying from 1.5 to 2.5 mills per kilowatt hour. On the other hand, many water power plants are able to produce primary power at the power site at similar costs and, when plentiful supplies of water are available, water power plants could produce surplus kilowatt hours at virtually no cost. Certain blocks of offpeak capacity are sometimes available over a large portion of the hours of the year and are suitable for the production of hydrogen and oxygen. There are locations and circumstances where immense volumes of hydrogen could be produced at overall costs varying from about 12c to 40c per 1000 cu. ft. and where pure oxygen would be a free by-product in immense volumes. If, however, costs were distributed evenly over both hydrogen and oxygen, we would have overall costs varying between 8c and 27c per 1000 cu. ft. (two-thirds hydrogen and one-third oxygen.)

In industry at the present time the consumption of pure hydrogen totals something like two hundred billion cu. ft. per year in the production of material used in the manufacture of fertilizers, explosives, artificial silks, lacquers, soaps, edible fats, synthetic gasoline, synthetic alcohols and other products. In order to convey an idea of the extent of the world demand for pure hydrogen which has all developed in the last 20 years, it may be said that, if all this hydrogen were produced by electricity, the generator capacity required would be about four times that of all power plants owned by the Hydro-Electric Power Commission of Ontario.

In the final analysis, the principal source of hydrogen is water, whether steam is decomposed by coke or whether water is decomposed by electricity. The latter procedure has many advantages already well established in industry and it is therefore logical to expect great expansion in the process of water electrolysis.

Paper presented at Canadian Gas Association Convention, Ottawa, Canada, June 10, 1937.

This is particularly evident when we consider that the use of hydrogen is yet in its infancy and that it yet remains to produce oxygen at low costs wherever it may be required.

In the above, reference has been made to hydrogen in a substantially pure state. There has been no reference to the fact that all gas works are in a sense hydrogen factories in that their product contains a large percentage of hydrogen, this hydrogen coming chiefly from water consumed in the form of steam. Gas works of course also consume immense quantities of oxygen originating from air and steam. Viewed in this way, the gas industry has always been largely a hydrogen-oxygen proposition in spite of the fact that these materials have never been available to the industry in their pure states.

Experts have long realized the potential advantages of having pure oxygen available and the technical literature is replete with papers and theoretical studies on the subject. Possibly the latest is presented in the 39th Annual Report of the Joint Research Committee of the Institution of Gas Engineers and Leeds University bearing the date of Nov. 4, 1936. This Committee points out that the trend of the gas industry is towards complete gasification of fuels by means of oxygen and it outlines the intensive research under way in England along these lines. It also refers to the fact that, in Germany, two large companies are already using oxygen to manufacture industrial gas from lignite.

When we consider the manufacture of domestic gas, it becomes apparent that air may not be the logical source for oxygen. If we use air oxygen we produce a gas abnormally high in carbon monoxide and higher in gravity than the gas now in city mains. If however we use water instead of air as the source of oxygen we restore the balance and can produce gas almost identical with the gas now in city mains.

The Hydro-Electric Power Commission of Ontario may therefore claim to be among the first to demonstrate on a commercial scale how coal can be completely gasified by means of electricity for the manufacture of gas similar in composition, heat value and gravity to that now being distributed in city mains. (Table II.) In this work the Commission has had the co-operation of one of the leading gas engineering firms in America.

Previously to these demonstrations many theoretical papers had been published on the subject. In general their conclusions were highly favorable towards the use of oxygen but, in one or two published papers, a rather obvious theoretical error was made which led to the conclusion that oxygen would be of little value. However, with a correction of this error, the conclusions would be in line with those of other writers.

Virtually all experts, however, concluded upon purely theoretical grounds that new apparatus and new methods would have to be developed for the use of oxygen. It was argued that some process somewhat similar to that of the blast furnace, where ash would have to be discharged as molten slag, would have to be developed and that standard gas plant equipment and ordinary temperatures could not be used. However, actual performance on a commercial scale in standard equipment has lifted the oxygen process from the realm of speculation and experiment to immediate practicability.

The Hydro-Electric Power Commission erected a plant capable of producing some 2000 cu. ft. of oxygen and 4000 cu. ft. of hydrogen per hour. (Figs. 2, 3 and 4.) A stand-

Fig. 2.—Electrolytic Gas Plant, Hydro Electric Power Commission of Ontario, Leaside, Ontario. (Small building marked X houses complete producer plant).

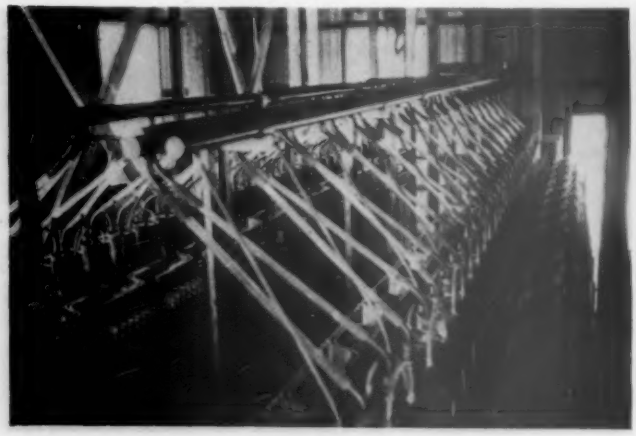


Fig. 3.—Top view of battery of cells.

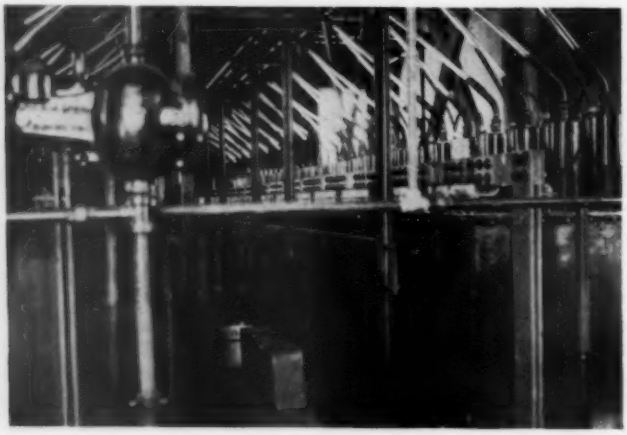


Fig. 4.—View between battery of cells.

ard type of gas producer having stationary grates was installed for operation with oxygen and steam. The outside shell measures 5 feet in diameter by 13 ft. 6 in. to the bottom of the fuel hopper, the grate area inside measuring 7.88 square feet. (Figs. 5 and 6.) The best means available were incorporated for measuring the input of oxygen, steam and fuel, temperatures, pressures, gas composition, etc. Some 15 tests were made extending over periods of 6 to 15 hours after operating conditions were stabilized. (Fig. 7.)

The following tables which are also shown on the screen, present typical results obtained from the gasification with oxygen and steam of (a) peat, (b) coke, (c) half coal and half coke, and (d) two-thirds coal and one-third coke. In order to use 100% coal it would be necessary to install a mechanical producer fitted with a fuel agitator of the Chapman type. Although these facilities were not available, the following tables include, along with actual results, a

Fig. 5.—Gas Producer installation.

rough estimate concerning the use of 100% coal.

Since gas was made at the rate of about 250,000 cu. ft. per day the tests were on a commercial basis and make possible the immediate introduction of the oxygen process into industry or gas works. The quality of gas made is better than can be made in water gas sets common to the gas industry and vastly better than ordinary producer gas which is consumed in large quantities in steel works and other metallurgical or ceramic industries. All who witnessed the tests were impressed by the ease of continuous operation with oxygen. In fact, the oxygen blown apparatus is as easily operated as an ordinary automatic gas producer used in industry.

If it were deemed essential to put into city mains a gas having the present standard of B.T.U. value, specific gravity and composition this can be accomplished by enrichment with oil or butane. The gas shown in the right hand column of Table II. would require the incorporation of only 1⅛ gallons of butane in each 1000 cu. ft. of finished gas to bring it to existing standards. This procedure shows a saving in weight of solid fuel over the common practice in water gas sets of about 57%, and much more than 57% saving in cost of solid fuel since coal is substituted for coke. Furthermore, considerably less oil or butane is required for enrichment purposes.

In the manufacture of 1000 cu. ft. of 450 B.T.U. gas, the cost of hydrogen and oxygen would be 10 cents with power at 2.5 mills. Coal costs add about 5c and butane may add about 12c, so that the total costs of materials per M. of 450 B.T.U. gas would be 27, or 6c per therm. If, however, we were able to eliminate enrichment and distribute 330 B.T.U. gas on a therm basis, the materials cost with 2.5 mill power reduces to 4.5c per therm.

Although it is a simple matter to carburet these gases to present standards and although costs would still be less than competitive methods, the lowest costs would be reached if 333 B.T.U. gas could be sold on a therm basis. It is already the practice in England and in parts of Europe and the United States to sell gas on a therm basis and there seems to be no good reason why this procedure could not be followed in Canada.

Lowest costs for materials per therm of gas would be reached if neither enrichment nor the incorporation of electrolytic hydrogen were necessary. It has been pointed out that hydrogen has wide and rapidly expanding applications in industry at values which may yield oxygen as a by-product. The type of gas made without hydrogen is that shown in the right hand column of Table I. (333 B.T.U.). With oxygen at no cost, the cost of materials (coal) would reduce to 2.1c per therm or only 7c per 1000 cu. ft.

Fig. 6.—Operating floor Producer Plant showing Fuel Hopper

With regard to the use of existing gas works equipment, the gas producers now used for heating retorts and ovens, might be used instead to manufacture gas for distribution. Similarly, water gas sets might be adapted for complete gasification of coal by means of oxygen. With regard to vertical retorts, Hodsman and Cobb (England), some years ago, suggested the use of oxygen and

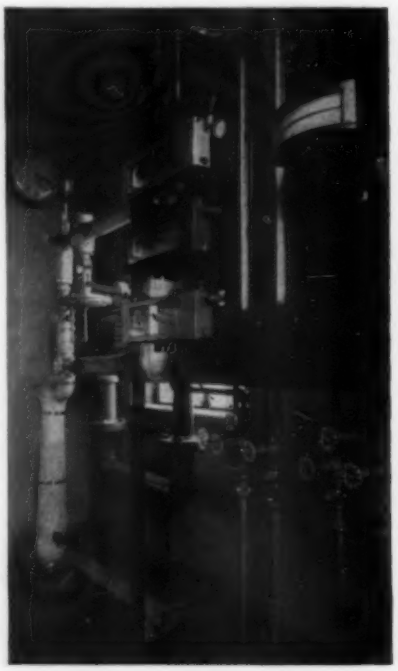


Fig. 7.—Recording instrument room, Producer Plant.

steam to fire retorts internally, to increase the gas make and to control the output of coke, as desired. Probably, similar procedure might also be used in coke ovens, with or without the use of oil for enrichment purposes.

When we reflect that gas of these types can be made in automatic gas producers at rates of from 75,600 (Table I.) to 105,200 (Table II.) cu. ft. per ton of coal and that a single producer may have a capacity of up to perhaps 5,000,000 cu. ft. per day, it becomes evident that cheap oxygen is capable of effecting a complete revolution in gas manufacture for both industrial and domestic purposes.

Probably it was something like this which Mr. Charles A. Munroe, President of the American Gas Association for 1921, had in mind when he stated before the Technical Section at the 1921 A.G.A. Convention:

"Some of you gentlemen are going to be able to give us a gas from raw coal of 420 BTUs and we are going to have no by-products to handle or sell, nothing but ashes to take away from the coal. When you give that to us then the problem of the owner of a gas company will be much simpler than it is today, when he must make coal gas with an enormous quantity of coke left as residue, which puts him into a business of a larger dollar and cents annual turn-over than his gas business. . . . What we want is to have a gas plant that will enable us to put coal in and take gas out and leave nothing but cinders."

Similarly, the 39th Report of the Joint Research Committee of the Institution of Gas Engineers and Leeds University may be quoted:

"When the Gas Industry seeks expansion by supplying gaseous fuel where solid fuel has hitherto been employed, the production of solid fuel in quantity at Gas Works may well prove an embarrassment. . . . The probable future trend of the Gas Industry's business is the complete conversion of coal into gas . . . preferably made by continuous gasification with oxygen."

These British Authorities have recognized the fact that oxygen derived from air by liquefication would produce a gas abnormally high in carbon monoxide and they therefore propose to subject the gas made with oxygen to a process of catalysis, so as to yield gas containing much less carbon monoxide and a considerable quantity of methane, the final product not being greatly dissimilar from coal gas.

The present writer has emphasized in this paper how this complex secondary processing can be circumvented and how complete gasification can be introduced immediately even into small gas works. This is accomplished by utilizing electrolytic hydrogen and electrolytic oxygen (in place of air oxygen only) to produce gas of normal carbon monoxide content and having the present standards of B.T.U. value, specific gravity and composition without any complex secondary processing.

Table I.—Gas Made With Oxygen

(Not including Electrolytic Hydrogen)

FUEL	100% Peat	100% Coke	50% Coal 50% Coke	67% Coal 33% Coke	100% Coal (Estimated)
B.T.U. of Gas Make	311	297.6	328.0	322.0	333.0
Specific Gravity (approx.)	0.7	0.7	0.7	0.7	0.7
Lbs. fuel/M of gas made	47.3	23.6	26.5	26.5	26.5
Lbs. steam/M of gas made	16.7	17.2	15.5	15.5	16.0
C.F. oxygen/M of gas made	184.0	219.0	207.0	174.2	170.0
C.F. gas/lb. fuel	21.2	42.4	39.4	37.8	37.8
Cold gas efficiency %	89.0	95.0	91.8	88.0	90.0
Approximate Analysis					
Carbon Dioxide	12.7	7.6	7.4	9.7	
Illuminants	0.9	0.2	0.7	0.8	
Oxygen	0.5	0.5	0.2	0.3	
Hydrogen	35.2	31.0	32.8	36.6	
Carbon monoxide	45.6	59.9	56.2	50.0	
Methane	0.7	....	0.7	1.1	
Ethane	1.6	....	1.2	1.0	
Nitrogen	2.7	0.8	0.8	0.5	
Total	100.0%	100.0%	100.0%	100.0%	

Table II.—Gas Made With Oxygen

(Including Electrolytic Hydrogen)

FUEL	100% Peat	100% Coke	50% Coal 50% Coke	67% Coal 33% Coke	100% Coal (Estimated)
B.T.U. of Gas Make	316	307	326	322	330
Specific Gravity (approx.)	0.55	0.53	0.53	0.53	0.53
Lbs. fuel/M of gas made	34.6	16.2	17.9	19.7	19.0
Lbs. steam/M of gas made	12.2	12.0	11.3	11.5	11.9
C.F. oxygen/M of gas made	134.0	153.0	146.0	129.0	126.9
C.F. hydrogen/M of gas made	268.0	306.0	292.0	258.0	253.8
C.F. gas/lb. fuel	28.9	61.8	55.8	50.8	52.6
Approximate Analysis					
Carbon Dioxide	9.3	5.3	5.2	7.2	
Illuminants	0.7	0.2	0.5	0.6	
Oxygen	0.4	0.3	0.1	0.2	
Hydrogen	52.7	52.1	52.5	53.0	
Carbon monoxide	33.4	41.7	39.8	37.1	
Methane	0.5	....	0.5	0.8	
Ethane	1.2	....	0.8	0.7	
Nitrogen	1.8	0.4	0.6	0.4	
Total	100.0%	100.0%	100.0%	100.0%	

Canadian Gas Association Convention

The 30th Annual Convention of the Canadian Gas Association held at Ottawa was one of the most practical and interesting meetings in the history of the organization. Papers were of a high character and of vital moment, and discussions that followed showed with what interest and enthusiasm they were received. The finances of the Association reflect great strides, and never were better in the society's 30 years of growth. Natural and manufactured gas men are now on an equal footing and this in itself has created much wider co-operation.

Officers for the year 1937-38 are: President, Edward J. Tucker, General Manager and Secretary, Consumers' Gas Co., of Toronto; 1st Vice Pres.—T. P. Pinckard, Vice President and General Manager, United Gas & Fuel Company of Hamilton, Ltd.; 2nd Vice Pres.—Julian Garrett, Manager, Northwestern Utilities, Ltd., Edmonton; Secretary-Treasurer—George W. Allen, Gas Survey Engineer, 7 Astley Avenue, Toronto.

An exhibition of gas appliance and equipment may form part of the 1938 convention at Toronto. If held it will be the first Canadian exhibit of appliances in over 20 years.

Practical Advertising and Salesmanship in the Gas Business

By G. W. Allen
Gas Survey Engineer,
Toronto, Ont.

THOUSANDS of would-be advertising men and near-salesmen have a fairly abundant general knowledge of the profession in which they are respectively engaged, but through an inability to apply the knowledge in a constructive manner, fail to make the impression on the public mind that is so necessary in the making of profitable sales.

At the outset I may say that we of the gas business must early learn to realize that the people generally are not interested in us or our business as such. They care no more for our product, or our appliances, than they do for the moon. What they are interested in is what they can get out of the use of our products. They are only interested in us to the extent of how near we can come to meeting their particular needs. Questions ever in the public mind, if it considers the matter at all, are "What benefits do we receive if we use gas?" "What will it do for us beyond what any other or competing product can do?" "Would it be profitable to us to use gas?" or "Will we obtain greater comfort, convenience and more satisfactory service, if we use gas?" Happy, therefore, is the gas utility advertising man who can, through means of the printed word, convince the people that "if it is done with heat, it can be done better and cheaper, too, with GAS."

Now, in the matter of lay-out—I mean preparing the advertisement—we should ever keep in mind that the first step towards successful advertising appeal is to lay out our ads in such a way that favorable attention is attracted to them. Most ads in general do not attract FAVORABLE attention. They may attract attention through a form of hieroglyphical-typographical arrangement of type, borders and illustrations, but it is not the kind of attention we of the gas business want—in most of such instances it is UNFAVORABLE attention that is received. The more common sense we use in our lay-out work, the more practical results will we obtain from our advertising. Most ads contain far too many different styles and sizes of type, which tend to make the ads difficult to read, and result in the reader passing over them altogether. Illustrated ads are by far the most effective, but, even here, the illustrations should be of a character that draw attention to the results of the use of gas, rather than the product itself.

The proper placing of illustrations in advertisements is another important consideration. The readers of the newspaper or magazine, whom we are seeking to attract favorably, should not be conscious of the fact that our ads are ads only, but that they are in very truth harbingers of blessings capable of being enjoyed by all, and messages of vital import to all who use them in any form, whether it be in domestic, commercial or industrial gas service. We do not want people to say, "Oh, it's only an AD"—We want readers to be so attracted by what we are going to bring to them through the use of gas, and to be so interested in what we illustrate, and what we say in our appeals, that they will be unconscious of the fact that they are simply reading an advertisement after all.

Good illustrations, properly placed, so that the eye of the reader quickly grasps their significance, and is led directly to the vital headline, or opening statements of the proposition, are vitally essential to the success of an advertising appeal.

If what we say in our headline, or title, is not directly of vital importance to the welfare of the reader, no further notice will be taken of the advertisement. It is the same with a salesman—If he is not able or capable of attracting the favorable attention of the person he is approaching, either by his appearance, or what he immediately says by way of introduction, he might as well quit there and then, for all the further headway he hopes to make. Good salesmen dress in modest apparel and usually pay great attention to those things necessary for favorable introduction so, why advertising men continue to resort to all kinds of forms and shapes, many styles and sizes of type, freakish-looking and hieroglyphically-appearing advertisements, in hopes of attracting FAVORABLE ATTENTION, is more than I can say. I do know that this kind of advertising appeal is what brings about the tremendous wastes going on in the advertising profession throughout the world today. Over 80 per cent (if my memory serves me right) of all money spent in advertising, taking it as a whole, is wasted in unprofitable advertising appeals. Surely, under these circumstances, we should do our part to improve the appearance and general efficiency of our advertisements. By means of a few lantern views at close of this paper, I hope to point out some of the things to beware of when making up advertising copy, or lay-outs, and to show some of those things that others have done towards making their advertisements of an outstanding character. If more advertising men had to pay the piper, should their ads fail in making sales, there would be more attention paid to the vital points necessary in attracting FAVORABLE ATTENTION to their appeals.

Abstract of paper presented at Canadian Gas Association Convention, Ottawa, Canada, June 10, 1937.

National Bureau of Standards Calls Conference on Corrosion

Subjects affecting standardization of underground piping systems will be discussed at a conference on corrosion to be sponsored by the National Bureau of Standards during October or November, 1937. Exchange of ideas among those engaged in investigation of mitigation of underground corrosion will be the purpose of the conference. Only hitherto unpublished papers will be presented, and attendance will be limited to those who have contributions to make.

Topics suggested which will have a bearing on standardization are:

Methods for determining the corrosivity of soils

Methods for determining the condition of pipe lines

Tests and specifications for pipe coatings

Anyone wanting to take part in the conference should notify K. H. Logan, National Bureau of Standards, Washington, D. C., indicating the subject or general nature of the contribution he wishes to make. He should also indicate his preference as to the date of the conference.

System for Commercial and Industrial Market Analysis and Sales Routine

By

Albert Crownfield, Jr.

SIX years ago, it was my experience to be literally dropped into the gas business with two weeks training on top of a good general education and four and a half years of accounting experience. Practically no instruction was given in sales training and it was a case of sink or swim. Well, my strength lasted through the leanest depression years and about a year ago, the restaurant trade seemed to be pretty well rounded into shape. A major portion of the other reachable markets also seemed to be on our mains.

Briefly, the situation left a choice of two lines of action. One was to claim that we had most of the business we could get, and take it easy. The other was to analyze the market for two conclusions. First, to find the additional load possibilities from present customers, and second to tie down everything so that in the end we would know just what percentage we had, compared with the available heating potentialities for each class of business.

The latter idea has been developed into a system which gives definite, conclusive results, and a definite, planned program for action which is described as follows:

First each meter book was thumbed through, sheet by sheet. For each sheet which showed or had shown a commercial or industrial coding at any time, a 3 x 5 card was made up as in Exhibit "A." These cards were then set up as an index file and classified by types of business, as listed in the city directory. Later this was checked against the classification shown in the A.G.A. Industrial Service Letter No. 22, "Commercial Sales Outlets." The individual cards were filed alphabetically under each classification. Indices such as Exhibit "B" were also made according to the following list of group headings:

Apartments	Hotels
Armories (State)	Jewelers
Auto Repairs	Laundries
Bakeries	Libraries
Banks	Locksmiths
Barbers	Meat Markets
Beer Distributors	Morticians
Beauty Parlors	Offices
Billiard Halls	Optometrists
Beverage Manufacturers	Photo Studios
Churches	Plumbers
Cigar Stores	Printers
Clubs	Restaurants
Confectioners	Schools
Dentists	Shoe Parlors & Hat Repairs
Doctors	Stores (Miscellaneous)
Drug Manufacturers	Tailors
Drug Stores	Taxi & Bus Offices
Filling Stations	Theatres
Fruit Distributors	Welders
Grocers	Municipal Accounts
Hardware Stores	Industrial Accounts
Hospitals	

After the index file was set up, a Survey Sheet, Exhibit "C," was made for each customer. This sheet shows the customers' name, address and type of business. It shows a survey of present gas conditions through present annual consumption, inventory of gas equipment in use and that not in use. It shows estimated potential heating load by type of work, fuel, amount, and equivalent value in gas consumption. The sheet also notes service and fuel line capacities showing what provisions will be necessary to accommodate ad-

EXHIBIT "C"

Commercial & Industrial Gas Survey

Acct. # 9516-110 District Eastern

Street & No. 5 Main St

Name Jack's Diner Type of Business Restaurant

Person to Contact John Dough Present Annual MCF 1500

Is gas used at present 23. Potential Annual MCF 360

A- Gas equipment connected & used

Short order range — 2-Gas-steam Radiators
Griddle — Vulcan Range 175#
Flame — Baking Stove
Steam Table — Blodgett oven
Acorn Range - old

B- Gas equipment not used — Available Annual Use- MCF

None

Total

C- Heat Applications using other fuel

Application	Present Fuel	Estimated Amount Annually	Available Annual Gas Use-MCF
Cooking			
Water Heating	coal	16 Tons	360
Incidental Space Heating			
Total			360
Total B + C			360

Location of nearest gas service Kitchen

Lateral Cost, if necessary none

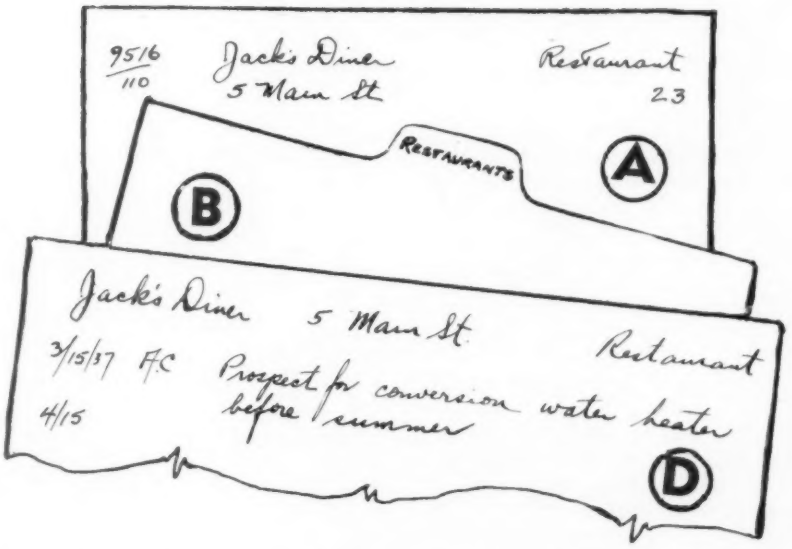
Size of Service 1½" — 75 ft

Size of fuel line 50 ft of 1½" — kitchen 50 ft of ¾" — cart

Approximate length of fuel line see above

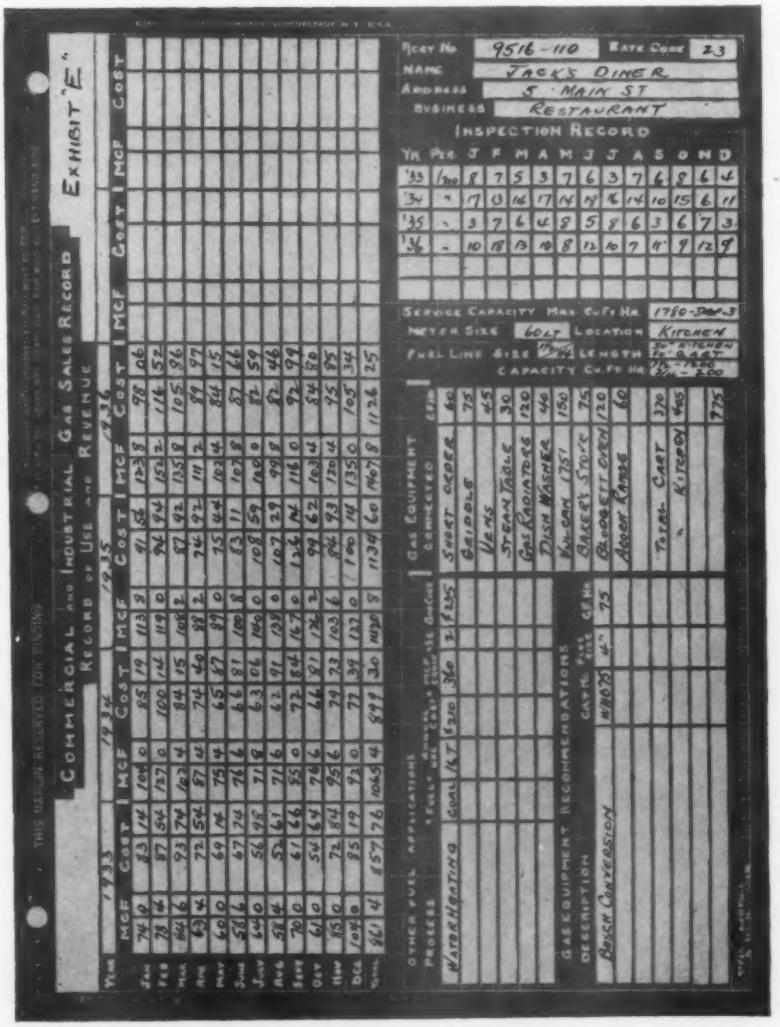
ditional load. Naturally this information must be obtained by actual field survey.

The Exhibit "C" shows a completed survey and analysis after the field check has been completed. In this case, it will be noted that the consumer is using gas for all applications except water heating. Since volume water heating is considered obtainable on our rates, in this case a Prospect Record Card, Exhibit "D," is made up. This is a plain 4 x 6 card. These cards are logged for sales calls in a date file. Each day, cards logged for that day are distributed to the salesman concerned. As he makes each call, a brief summary of results is noted and the card is then logged and filed for the next call date.



After the general survey, detailed analysis of operations may be made separately when required in industrial and large commercial applications. In such instances as this, judgment and common sense are all that is required in developing a proposal showing comparative operating characteristics, advantages and cost comparisons.

In connection with this setup, there is also a form for a statistical record as in Exhibit "E." For large customers this summarizes gas use over a period of six years and shows at a glance all pertinent information regarding that customer. The exhibit in this case shows steady increase in use up to where every application has been swung to gas except the water heating. There is also a summary of "Connected Equipment," a brief analysis of "Other Fuel Applications" and a brief description of "Recommended Equipment." In addition to this there is information on service, meter and fuel line capacities.



Besides this a record is kept of routine appliance inspection by the service department. Customers are classified by service requirements and inspected on either a monthly, quarterly, semi-annual or annual basis. Periodically, Inspection Sheet, Exhibit "F," is made out according to schedule. A service man makes the inspection and notes the work performed. If parts are needed, this is also noted. The Inspection Sheet is then forwarded to the Commercial Department where the inspection date is noted on the form, Exhibit "E." If parts are needed a representative calls, advises what parts are desirable and why. If the customer wishes replacements he is advised part numbers and instructions for ordering.

Although we have wandered a little from the subject of market analysis, the last few paragraphs show how the "Sales Record of Use and Revenue" ties in with the survey and servicing.

The Survey Sheets, Exhibit "C," are sorted by class of business and route number. The route number serves as a cross reference with the 3 x 5 Classification File. This also places the sheets in sequence for calls in the same locality. As each class of customers is surveyed, ap-

plications should be checked against the listings in the "Industrial Service Letter No. 22."

Where the directory shows establishments which are not included among the gas customers, a separate list is made of names and addresses. Each one can then be surveyed and analyzed for possibilities. An illustration of this is shown by the following analysis of the tailoring trade. In this case, the directory showed 24 tailors listed. Analysis showed 11 using gas boilers all year round, 4 open only in the summer, 7 operating from residences, 1 using an electric iron, and one could not be located.

As the survey for each class of business is completed, the results give a very definite answer to all of the questions about present and potential load. A summary of results for the restaurant group, in one instance, serves as an excellent illustration.

Restaurant Group

Listed in Directory	75
Gas Customers	75
Using gas for cooking, water & space heating	2
Using gas for cooking and water heating	45
Using gas for cooking	60
Prospects for cooking	2
Prospects for water heating	3
Credit unsatisfactory	8
Not interested	3

This plan brings to light prospects for cooking, water heating, baking, and many applications that might otherwise be obscure. It also provides a regular and systematic plan for contacting each customer.

EXHIBIT F

INDUSTRIAL AND COMMERCIAL GAS INSPECTION

Address 5 Main St. Name Jack's Diner

Date 1/4/36 Inspection Interval 1 mo Type of Business Rest

Equipment	Make & No.	Age	Condition
1 Hot plates and griddles		old	good
1 Heavy duty ranges	1751 Vulcan	old	fair
1 Kitchen Ranges	Jewett	old	poor
1 Broilers	Savory	7 yrs	good
1 Bake Ovens	Blodgett	6	fair
Deep Fat Fryers			
3 Coffee Urns		3 yrs	good
1 Steam Tables		6	good
1 Confectioner's Stoves	Vulcan	6	fair
Industrial Equipment			
7 Gas Radiators	Clow	6	good
1 Dish Washer		6	good
Water Heater			

Description of work completed: Regulated gas and air on all appliances. Drilled ports on short arm range.

Description of work to be done: Completed

Parts to order: Bakers stove needs new top rings.

General Remarks:

Inspected by John Brown

In conclusion, results have proven the practical value of this plan. It should be adaptable in any gas territory, large or small, with perhaps a few small changes in forms to meet varying conditions. All forms used in this set up were made at very little expense.

The All-Gas Home Featured in the Boston Herald

The far-flung service of the Eastern Gas and Fuel Associates which includes Boston Consolidated Gas Co. and New England Coke Co. was well presented in a feature story occupying an entire page in June 6th issue of the Boston Sunday Herald.

Prepared by John R. Sullivan, Business Editor of the Herald and written from a popular point of view it embraces the activities of these associates in word and picture.

The focal point is a four column illustration reproduced herewith showing a complete modern all-gas home and indicating the location of appliances for heating, air conditioning, incineration, water heating, refrigeration, cooking and clothes drying.

It is one of a series of educational advertisements about outstanding New England industries and tells the story of gas and coke from coal mine to home appliance.

As a factor in fostering favorable employee relationship, reprints of the page were distributed individually to all employees of the Boston Consolidated Gas Company with a letter from the management calling attention to it.

The Makers of

BARBER BURNERS

Renew a

PLEDGE of SERVICE

To the Industry!

FOR nearly 20 years Barber Gas Burners have led the field. During this period other gas burners have come and gone—but Barber has maintained an impressive record on the one test that governs the success of any burner—PERFORMANCE! Untold labors of patient development, under the hands of skilled engineers, have made Barber Products what they are today. That is Progress.

We take this opportunity of pledging to the Heating Industry, Gas Companies, Gas Appliance Manufacturers, and the public generally our continued and increasing cooperation—to the end that traditional "Barber Satisfaction" may have a still wider significance.

Barber designs and builds many types of Burner Units for Gas Appliances, Conversion Burners for Furnaces and Boilers, and Gas Pressure Regulators. Write for Complete Illustrated Catalog and latest Price List.

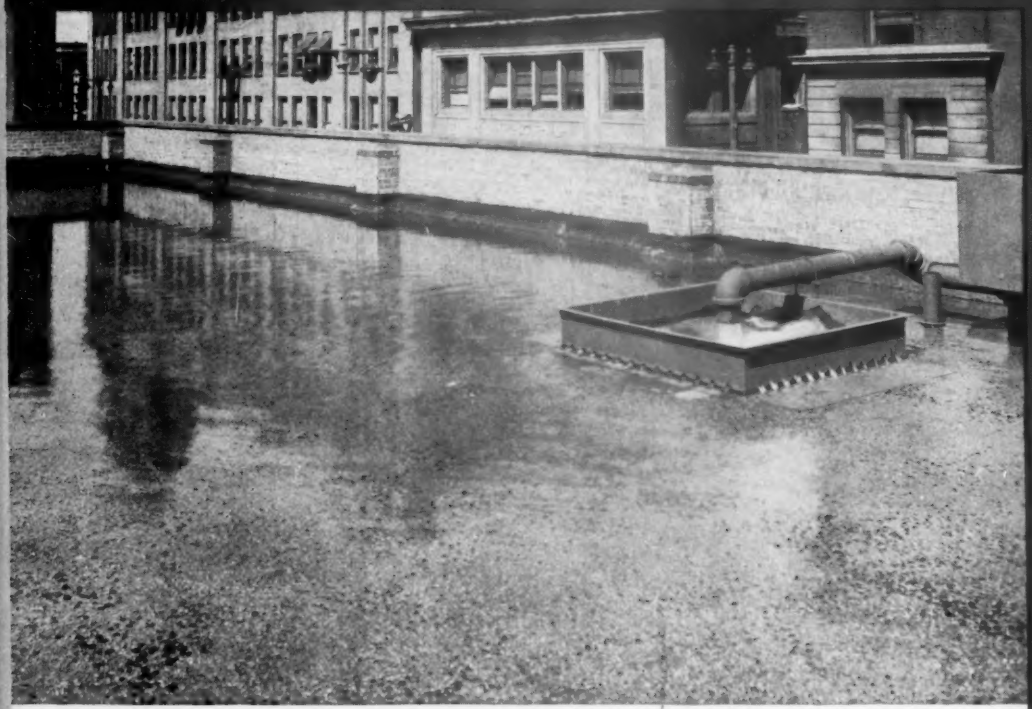
THE BARBER GAS BURNER CO.

H. M. MANSFIELD, President

3704 Superior Avenue
Cleveland, Ohio

Address Michigan Inquiries to
The Barber Gas Burner Company of Michigan
4475 Cass Ave., Detroit, Michigan

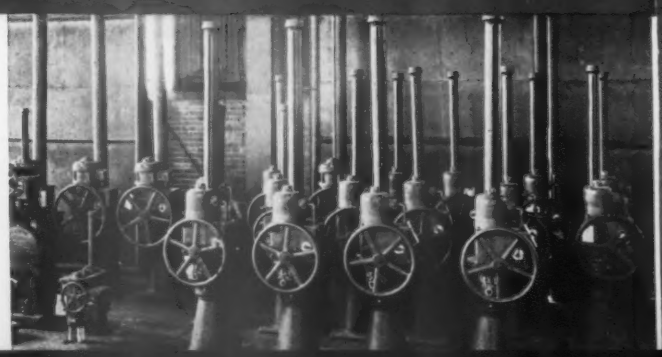
KOPPERS



Let a Koppers Roof Help You Sell More Air-Conditioning Installations—The fast-growing air conditioning field offers rich opportunities for boosting gas consumption. In your work in promoting air-conditioning installations, you will want to know about the recent strides in the utilization of flat roofs to aid in air conditioning. Let us send the specifications for the Koppers Flooded Roofs, and the story about how they work in air conditioning. This photograph shows the Koppers Water-Cooled Roof on the J. C. Penney store at Milwaukee. (Be sure to specify Koppers Coal Tar Pitch and Tarred Felt on all roofs where water is to remain in contact with the roofing for long periods).

Koppers Lumino Paint Pays Out "Two For One." One cost, one coat, one application . . . but two-fold results. The bituminous-base paint which forms the vehicle is a corrosion resisting, moisture defying shield of protection for metal (or concrete). The Alcoa Albron Aluminum Powder "floats" to the surface, forms an interleafed metallic surface, pleasing in appearance, and reflecting 70% of the radiant heat to which it may be exposed. Write to Koppers Co., Pittsburgh, for full details.

Western Floor Stands Stand Inspection—Part of an order of motor operated stands, awaiting shipment. One of many products made by Western Gas Division, these stands are available in a variety of motor controls and for manual operation, have demonstrated their dependability in countless applications. Western Gas Division, Fort Wayne, Indiana, will send you full information on Western Stands and other equipment.



Principal Koppers Products Serving the Gas Industry

MECHANICAL TIME CYCLE CONTROLS
COKE OVEN PLANTS
WATER GAS SETS
HEAVY OIL WATER GAS PROCESSES
SCRUBBERS
CONVEYING SYSTEMS
FAST'S SELF-ALIGNING COUPLINGS
TREATED LUMBER
FLOOR STANDS • FIRE HYDRANTS
GAS PURIFICATION PLANTS
MOTOR FUEL RECOVERY PLANTS
OIL FOGGERS
BITUMINOUS-BASE PAINTS
COAL TAR PITCH AND FELT ROOFING
WATERPROOFING MATERIALS
PIPE
AMERICAN HAMMERED PISTON RINGS
TARMAC PAVING MATERIAL
SULPHUR RECOVERY
GAS HOLDERS • TANKS
GAS, AIR, TAR AND WATER VALVES
DISINFECTANTS
INSECTICIDES • DEODORANTS

●

Koppers Divisions, Subsidiaries and Affiliates Serving the Gas Industry

AMERICAN HAMMERED PISTON RING DIVISION — BALTIMORE, MD.
BARTLETT HAYWARD DIVISION — BALTIMORE, MD.
ENGINEERING AND CONSTRUCTION DIVISION — PITTSBURGH, PA.
GAS AND COKE DIVISION — PITTSBURGH, PA.
TAR AND CHEMICAL DIVISION — PITTSBURGH, PA.
WESTERN GAS DIVISION — FORT WAYNE, IND.
EASTERN GAS AND FUEL ASSOCIATES — BOSTON, MASS.
THE KOPPERS COAL COMPANY — PITTSBURGH, PA.
KOPPERS-RHEOLAVEUR COMPANY — PITTSBURGH, PA.
NEW ENGLAND COAL AND COKE COMPANY — BOSTON, MASS.
THE WHITE TAR COMPANY OF NEW JERSEY, INC. — KEARNY, N. J.
THE WOOD PRESERVING CORPORATION — PITTSBURGH, PA.
NATIONAL LUMBER AND CREOSOTING COMPANY — TEXARKANA, ARK.

Koppers entered the coal business to obtain an assured supply of the best coking coal, remains its own most exacting customer. The research, the investment, the extra care expended in meeting rigid Koppers standards, come to other users as an extra dividend. Twenty-five mines in various sections assure the variety and the capacity to meet all needs.

THE KOPPERS COAL COMPANY
Koppers Building, Pittsburgh, Pa.

A KOPPERS COAL FOR EVERY PURPOSE

Having found the proper combination, Koppers runs no risk of losing it. Research is continuously carried on, holding the quality of Koppers Coals at a consistent high. The services of the trained personnel are available for special analyses, testing or investigation.

Preparation of Koppers Coal is thorough and painstaking. Equipment is modern, and includes picking, shaker-screening, and boom-loading. Much of the coal is washed in Koppers Rheolaveurs. The inspection department works for YOU . . . they reject at the first sign of sub-standards, and there is no appeal from their decision.

Koppers capacity totals 15,000,000 tons annually. Delivery facilities include "all-rail" shipments to market; delivery to lake ports; and to tide-water piers. Koppers has the largest fleet of collieries on the Atlantic Coast. Nine railroads serve Koppers mines. Branch offices are located in principal cities.

KOPPERS COMPANY

DESIGNERS · BUILDERS · PRODUCERS · MANUFACTURERS · DISTRIBUTORS · OPERATORS

Goodbye to Scale trouble!

. . . *install* NATIONAL SCALE FREE PIPE

USE NATIONAL Scale Free Pipe and get rid of costly trouble caused by mill scale. Its smooth, clean interior makes it highly desirable for gas service lines because it has nothing which might clog small orifices, injure meters, or otherwise harm service. Mill scale is removed mechanically from NATIONAL Pipe—butt-weld sizes ½ to 3 inches.

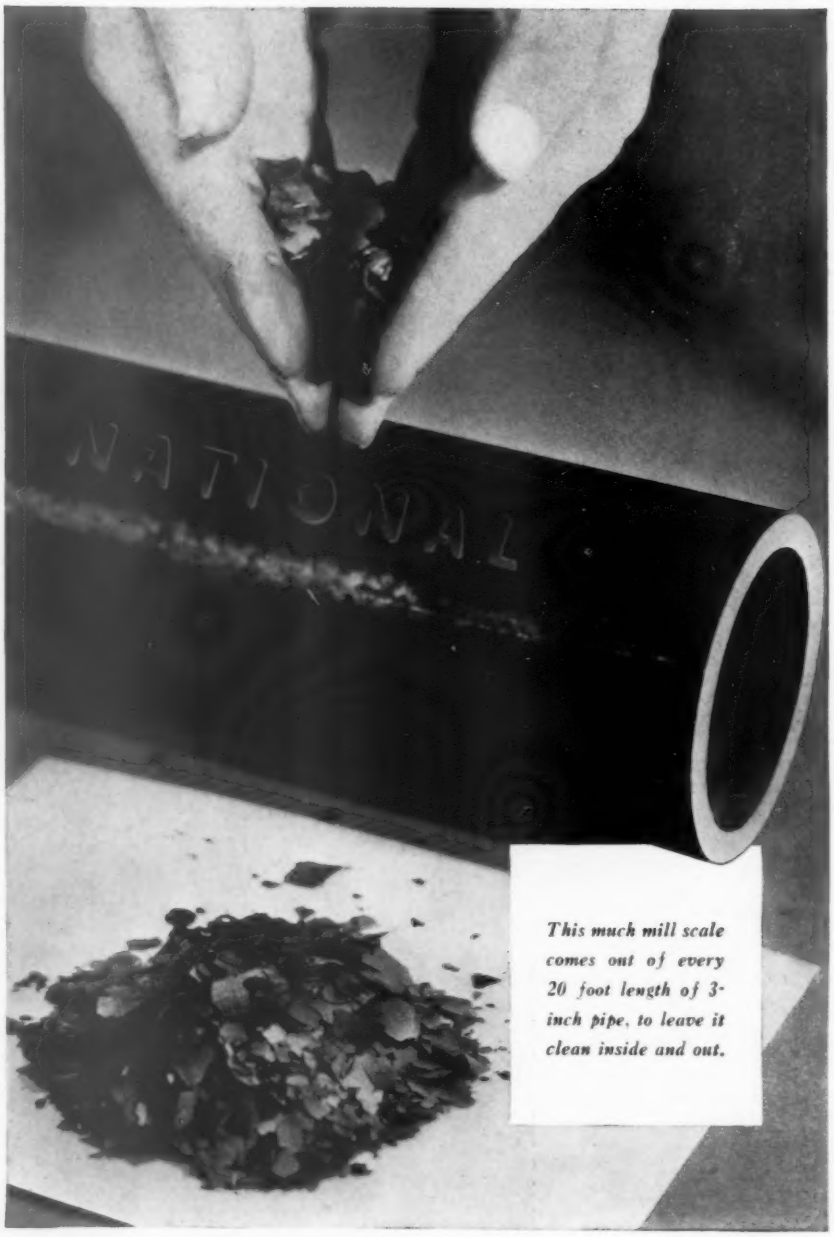
IT IS SPELLERIZED
— to resist corrosion

This removal of mill scale, plus the special Spellerizing Process applied to butt-weld sizes 4-inch and under, gives NATIONAL Scale Free Pipe extra resistance to corrosion. Avoid costly repairs or replacements by specifying or ordering NATIONAL, the original Scale Free Pipe.

ADVANTAGES

1. Minimized corrosion—particularly pitting.
2. Better base for galvanizing or other protective coatings.
3. No damage to valve seats; no clogging of small orifices.
4. Greater strength at the weld—due to the extra rolling in the process.

NATIONAL
Scale Free
PIPE



This much mill scale comes out of every 20 foot length of 3-inch pipe, to leave it clean inside and out.

NATIONAL TUBE COMPANY

PITTSBURGH, PA.

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

Pipe Corrosion and Coatings

Corrosion Survey

(Continued)

Part 13

By Erick Larson

THE density of pitting is important to note as the relative economy of repairing or discarding would depend upon the number of pits in a given area or length.

Corrosion, classified as surface, whether general or localized should not be noted as such until the products which cover the original surface have been thoroughly removed to assure the surveyor that no pitting exists beneath the surface. Surface corrosion resembles atmospheric corrosion. The most familiar type of corrosion is that of ferrous metals and as only the surface is visible that is as deep as the average layman's conception extends. From a distance the appearance is of a complete uniform oxidation having a reddish brown to brown color. More intimate examination discloses that the rate of corrosion is variable, the degree of intensity being indicated by variations in thickness of the deposited products which are sometimes characterized by small globules of iron oxide or by pits. The numerous small

FIG. 4. Uniform corrosion with no scale. Pipe broken to indicate thinness of walls although surface appearance did not indicate extent. One small pit appears to the left.

tubercles grow both in thickness and area as the corrosion progresses and may finally join others to form a general coating of more than film thickness. As the layer of deposited products of corrosion thickens the appearance of the deposit changes from numerous small specks to a slightly wavy rough textured surface. Changes in color of the deposit may usually be traced to an accumulation or mixture of foreign matter rather than any change in the products of corrosion. As the scale, particularly when an iron oxide, becomes thickened to approximately 1/16" or more longitudinal and less frequently circumferential cracks may appear. The thick scale is most frequently brittle and rather soft and easily removed by striking the surface. When the scale is mixed with soil it may be so hard that even violent blows are resisted.

Nature of Scale

The formation of a scale is more common on the ferrous pipes than on the other metals in common use. Iron is most frequently found as an oxide, having a greater affinity for oxygen than any other element. Metals frequently and naturally tend to return to the state of the ore from which secured. Copper, zinc and the other metals less commonly used for pipe are sometimes found as oxides but most frequently in connection with other elements although oxygen may also be present in the compound. Therefore, where oxidation is the chief cause of ferrous metal corrosion, copper may be expected to last considerably longer than iron. Even where compounds exist which may attack copper there will not be the cumulative loss from oxygen and the one or more other deteriorating agents. The compounds resulting from the corrosion of copper or the metal other than iron are more frequently soluble than the ferrous products of corrosion and therefore it may be difficult to recognize that corrosion has occurred on such metals except for a shiny surface. Copper pipes have been observed which maintained the appearance of the initial pipe except for the shininess until complete failure occurred. Occasionally copper tubing will have areas of almost the full radius of the pipe in circumference or along the shorter axis which appear as though slightly hammered. Measurements would usually indicate that such areas had thinner walls than surrounding portions caused by a localized corrosion which may extend considerably deeper than obvious from appearances. What might appear as a surface corrosion in such instances may be found to be a deep but general penetration.

Corrosion, particularly of ferrous metals, is seldom uniform over the whole surface. Even though a rather thick scale has been deposited the surface of the uncorroded metal underneath the scale will frequently be found wavy or pitted although initially smooth. A sequence of corrosive action from a uniform deterioration to pitting is not often encountered in a single soil type. If the initial scale tends to be uniform it is not likely failure will result from localized pitting. A characteristic corrosion pattern of some soils is a series of shallow uniformly distributed depressions having an appearance varying from that of wavy wind blown sand to a choppy body of water. The surface of scale may be rough but not wavy while the metal surface below will indicate a considerable difference in the rate of corrosion in areas not as concentrated in size as pits. The corrosion of wrought iron pipe is frequently of this ridged or wavy appearance and is frequently but erroneously taken as typical of the metal. However, this type or appearance of corrosion is more characteristic of a soil than it is of any particular metal or form of metal. It is because of this reason that steel pipe has often been described as wrought iron.

Pitting

The next form is that of pitting. Pitting is distinguishable by the comparatively small area or areas in which the deep penetration of the metal walls occurs. Although ordinarily the top of a pit crater is more or less circular in shape they are frequently irregular in both shape and size but always well defined at the boundary between the crater and the remaining pipe surface. An abrupt change occurs between the pipe surface and the side walls of the pit with the pit wall most frequently perpendicular to the pipe face. Occasionally the pit has penetrated the pipe in such a manner that the pipe surface is undercut by the pit wall. This occurs when some metal surface condition exists which prevents spread of the corrosion such as is sometimes evident when paint is entirely undercut by corrosion and the paint remains as a membrane.

The given description of a pit applies to the appearance of the surface after all products of corrosion and foreign material have been removed from the crater. Detecting pits is difficult due to the surface appearance being most frequently uniform. The location of a pit is commonly recognized by the slight mounding which occurs above the crater with the peak of the tubicle over the deepest part of the pit. In other instances where the surface has no indication of a slight mounding, however small in size, there is ordinarily a change in color or shading of the surface over the pit location. This difference in shading may be very slight but with experience the spotted appearance can usually be detected.

Where the corrosion products or adhering matter is thick there is no surface indication of pitting and the only method is to thoroughly remove all of the scale above the pipe surface and then examine the pipe surface for changes in color or shading. On cast iron pipe, even where the corrosion products are not thick, it is extremely difficult to detect by appearance the location of pits and the only successful method is thorough hammering and brushing. This difficulty of detecting pits in cast iron accounts for the common expression that cast iron will not pit and will last indefinitely.

While wire bushing, sand blasting or mechanical cleaning will ordinarily expose not only the location but the depth of a pit there are occasions when only the violent striking of a pipe surface with a ball pein or sharp pointed hammer will break away the adhering scale. At other locations the material in a pit crater must be gouged out with a sharp instrument. Scale may be harder than the adjacent metal and adhere with a tenacity that requires breaking away some of the pipe metal in order to remove the scale. This hard tenaciously adhering scale is not typical of cast iron as it also and frequently occurs on other forms of ferrous metals. It can not be assumed that such a scale will prevent deep pitting underneath as severe pitting has frequently been found underneath such surface layers.

In the analysis of pit causes a highly localized reason for their occurrence is the use of tongs or other types of joining tools which have the tendency to leave depressions in the pipe surface. The depth of the penetration at wrench marks are not entirely due to the puncture of the mill scale by the implement but the displacement of the metal by sharp projections of the tool compresses the metal and leaves an internal stress providing one of the common causes of galvanic action.

Graphitization

A common form of corrosion on cast iron is graphitization which occurs through the removal of the iron from the wall of the pipe while the carbon remains in the same form as it occurred when the metal was originally cast. In its initial stages the graphitized section is soft enough to be cut with a knife. Sufficient strength remains to prevent collapse of the structure under ordinary sub-surface circumstances. Cast iron is composed of approximately 5½% of other than ferrous material most of which is carbon and all of which is rather uniformly distributed throughout the mass of the metal. The graphite which remains after the action has occurred all existed in the original metal and is not a product of corrosion but rather the substance remaining after removal of the metal. While somewhat porous the graphitized pipe is usually gas tight at low pressures unless physically disturbed or rupture occurs. The action is continuous as the graphite is porous and allows the passage of a supply of metal solvents or an electrolyte from the exterior of the pipe to the scene of action. After the completion of graphitization there is a tendency for the remaining substance to harden with age and the pipe form becomes slightly more resistant to the strains to which a subsurface structure may be subjected.

Graphitization is a disintegration which affects the physical properties of the pipe to a greater extent than can be accounted for by changes in the physical appearance of the surface or outside dimensions of the pipe. There is however a considerable loss of weight following disintegration. While electrolysis is a frequent cause of graphitization there are many salts capable of producing the action among which the salts of sulphate of lime and of magnesium are the most active solvents producing the condition.

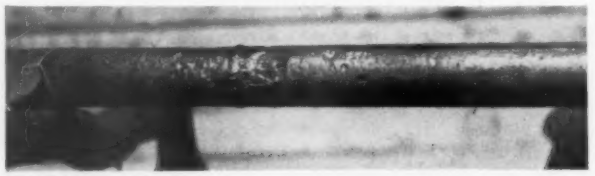


Fig. 5. A wavy type of corrosion which finally resulted in the penetration of the wall but which was confined to a short section of the pipe. The weld in the center of the deteriorated portion was practically unaffected.

The appearance of graphitized pipe is seldom any different than that of a corroded main but on removing the surface layer a substance looking and acting like the ordinary lead in lead pencils is distinctly characteristic. If it is possible to cut the pipe at the location of the graphitization there will be no doubt about the extent of the action as the line of demarcation will be distinct. When viewed through a magnifying glass or microscope the line of demarcation is not as distinct as when viewed by the naked eye, indicating the short distance in which the entire action is completed. Within rather short distances there is considerable variation in the depth of penetration of graphization, a cross section of the advancing face having a wavy appearance. It is not uncommon to have complete graphitization of the entire wall thickness occur over a small area and a similar depth of penetration not occur for some distance beyond in the affected length. Graphitization occurs somewhat similar to all corrosion being from a high rate at certain localized points in a single soil type down to zero.

Dezincification

Dezincification is a phenomenon occurring in brass in a similar manner to graphitization in cast iron. Brass being a mixture rather than a compound is composed

mostly of two metals both finely divided. The zinc in the mixture may be removed by electrolysis, including galvanic action as well as stray current or chemical action leaving almost pure copper in a porous spongy condition. The most favorable conditions are a good electrical conducting solution, such as salt water, a liquid with slightly acid reaction or a liquid containing high percentages of oxygen. This form of corrosion is not restricted by the thick walls encountered in some types of fittings or equipment used in transmission or distribution practices. Added thickness therefore, may delay the time of final penetration but not the actual rate of penetration.

The effect on the physical properties of the brass are similar to that on cast iron due to graphitization except that the pores are frequently larger and may result in gas leakage. This form of corrosion is most frequently highly localized, occurring within well defined areas. The action is ordinarily rapid, complete failure occurring more quickly than with graphitization of cast iron.

The removal of one metal in an alloy is not confined to brasses, particularly those having a high zinc content, but may occur in any mixture where the metals differ widely in chemical affinity from the corroding agent. The action will occur in aluminum bronzes. Brass service cocks and brass valve bonnets are the most common locations where this action occurs in gas transmission and distribution systems.

Erosion

Erosion which is the physical removal of metal by forces external to the pipe cannot be recognized from some other forms of corrosion caused by electrochemical forces. The surface may appear roughened as from sand blasting or shiny as when etched. When

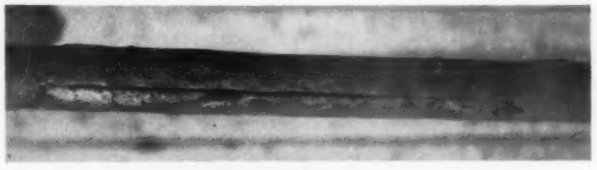


Fig. 6. Corrosion cracking. Note slight extent of deterioration except along butt-welded seam.

a pipe is exposed to direct action of a stream of water, the upstream side may be worn away and the surface be shiny while the downstream side be covered with scale. Erosion occurs only infrequently and the location readily indicates the cause. This is an instance where the cause must be determined before noting the form of corrosion.

On exposed surfaces erosion may be caused by vehicles striking the pipe once or occasionally and corrosion progressing at an increased rate at that point. The erosion of services exposed in deep gutters is sometimes a problem as part of the time they may be covered with soil or debris but during the rapid running of water actual wear will occur.

Cracking or Fatigue Form

The failure of metals from repeated reversals of stress called fatigue of metals is a well known phenomenon. Previous to total failure there frequently occurs a gradual lessening of the metal's strength. The rate at which the strength decreases is increased by exposure of the metal to corrosive agents. Fatigue stresses are concentrated, most frequently being a maximum at the metal's surface where corrosion is also most rapid. The occurrence of metal differentially stressed within very short spaces provides the essentials of a galvanic cell as previously mentioned. In gas practice it is not common to find conditions where the rapidity of stress reversals are sufficient to be classed as fatigue producing. However the conception of the action is clearer than the more common instances of cracking forms.

Deep, perpendicular walled cracks are sometimes found in buried pipes. There is usually an area surrounding the crack which has a graduated shading from the dark color of the crater to that of the metal itself around the corroded section. Seldom is more than one such crack found in a considerable distance on pipe although on metal sheets such as are found on unpainted holders or tanks the occurrence is more frequent. The elongated cracks may occur as frequently as pits on pipe. These cracks frequently occur where the metal is in tension. While fatigue of metals is usually described as caused by rapid reversals of stress it is conceivable that the cracks described may be caused by corrosion fatigue or as is more properly termed corrosion cracking. The rapidity of failure from corrosion cracking has been increased by the combination of two forces and the appearance of the result is characteristic. Unstressed metal will not deteriorate in similar corroding conditions as rapidly as one maintained in a stressed condition. The stressing may be confined to a small area when caused by conditions occurring during the manufacturing process. One example of a manufacturing condition would be a lap or butt welded seam in which the internal stresses had not been removed by proper annealing. Internal stresses may also occur in locations other than the seam or longitudinal joint from accidental causes during rolling or milling operations but are uncommon.

Classification by Location

Classifying corrosion by the location at which it occurs is not descriptive of the form as any one of the number of types of corrosion may occur at any single location whether geographical or on some particular section of a structure. It is not infrequent to find that the reason for excessive corrosion at particular locations other than the body of the pipe metal is cracking fatigue. In any description of the form of corrosion it is desirable to include a description by location as the causes may be more easily determined from this knowledge.

Body of Pipe Metal Joints

Circumferential
- Screw
- Welded
- Brazed
- Dissimilar metal intersections.
- Slip couplings
- Service connections
- Service through walls

Longitudinal
- Lap jointed
- Butt jointed

Fittings
- Valves
- Cocks
- Drips
  - External
  - Internal

Some of the locations particularly desirable to note as the place where excessive corrosion occurs are given in the above listing.

(To be Continued in August)

New Load Through Gas Flood Lighting

Report of Committee on Gas Flood Lighting

By

J. F. Tullie, Chairman

On Nov. 26, 1936, the director of the Sales Division of the N.E.G.A. appointed a committee on the subject of gas flood-lighting. This committee was directed to gather information and submit a report with suggestions for standardization of rates and policies for the promotion of gas flood-lighting and also to incorporate other information bearing on the subject which might prove of value in connection with its promotion.

A questionnaire was sent to all New England gas companies having one or more installations. The replies to the committee have been studied carefully and the conclusions reached in this report are based on these replies and reflect the accumulated experience thus far obtained.

Advantages of Load

The attractiveness of this type of business is conceded for various reasons among which are its: 1. Publicity value. 2. Favorable load factor.

Satisfactory proof is now available that gas flood-lighting is a superior kind of illumination. The advertising value, cannot be minimized, these fixtures being installed as a general rule in very prominent locations.

The starting time daily of the lighting load varies through the seasons from 4:30 p.m. in winter to 9:00 in summer so that for a small part of the year, this load overlaps the evening cooking load, but for a longer time lighting starts when the cooking load stops, therefore the load factor is excellent.

Prospective Market

Installations are now operating at filling stations, store fronts, taverns, roadstands, diners, automobile parking lots, nurseries, garages, as well as at locations in connection with gas company plants. Many other applications are possible such as athletic fields, outdoor swimming pools, etc.

Presented at the Summer Sales Conference, N. E. Gas Assn., Swampscott, Mass., June 10-11, 1937.

As the development of equipment proceeds involving the use of reflectors and other accessories a larger market will be available. High pressure street lighting is under development and practical equipment should be available soon.

Current Experience in Load Building

Analysis of reports thus far show that care must be exercised to secure installations which use light for the greatest number of hours per day. This figure now varies from 1200 to 3500 hours per year. Dusk to dawn lighting will give about 4000 hours, but it will be found that there are a limited number of such places to secure. The greater proportion of prospective installations fall into the 2000 hour per year class or in other words places which use light to midnight.

There are two sizes of lamps available, the number 1500 C.P. with an input rating of 30 ft. per hour and the number 3000 C.P. with an input rating of 60 ft. per hour. Although there is no rule governing the number of lamps to be installed in any given area, the average is two 3000 C.P. lamps for the areas now being lighted.

The load possibilities can be pictured therefore by taking a typical installation of two 3000 C.P. lamps at a location using light until midnight. This shows as follows 2—3000 C.P. x 60 cu. ft. per hour each x 2000 hours per year = 240,000 cu. ft. per year installation.

Service and Maintenance

Since the introduction of this new light about 3 years ago, operating characteristics have been watched closely and a great deal of valuable information is available to assist those who might otherwise experience difficulty.

Frost troubles which were in evidence at the outset have been eliminated by the use of a condenser box which becomes part of each installation. A persistent complaint for some time was unreliable ignition. Since the first of this year, however, with development of flame ignition, this difficulty has been satisfactorily overcome. We believe it safe to say that service costs in view of experience gained with flame ignition will and are being substantially reduced.

Continued customer satisfaction depends upon good service technique. Any gas company attempting to secure flood-lighting must be prepared to render an anticipatory type of service which will insure constant and uninterrupted service.

Those companies having a number of installations on their lines have worked out practical solutions of this problem. The details of which are not embodied in this report, but are available to those interested. In general, however, it has been found that the average life of a mantle is about 200 hours and lamps are indexed for service and renewing of mantles every five or six weeks, in this way mantle destruction is anticipated and tends to reduce glassware breakage to a minimum.

Reports from those with experience show maintenance cost at wide variance from $16.00 per year per lamp to $22.00 per year per lamp. These figures are now being reduced with the use of flame ignition.

Promotion Policies

Several plans are in use for developing flood-lighting. It has been found that electric rates applying to commercial lighting are comparatively high which furnishes the opportunity for adopting a gas rate which in many cases could exceed existing general rates and still be competitive.

After a study of local electric rates some companies have fixed a rate applying to this class of business only, while others are using their general rate. There is also difference of opinion as to what policy is best with regard to customer charges for equipment and installation.

It seems, therefore, that better progress can be made if participating companies could subscribe to a general principle with regard to policy, admitting that the actual rate per thousand would have to vary between localities as is the case with practically all other classes of gas business. The desirability of standardized general policy becomes evident in the case of filling stations of National Refining Company chains operating over a large area. Very much less sales opposition is encountered if the utility proposition is substantially the same in all communities. The most serious handicap in placing flood-lighting installation is the initial equipment cost and installation cost. This figure in general is somewhat more than electric luminaries. Considering the obstacle the policy generally favored is to capitalize the equipment cost and charge for installation on a basis of cost of labor and material, the gas company assuming cost of maintenance and adopting a gas rate which provides for amortization within a reasonable length of time. A clause is also embodied in this policy which assures a minimum annual guarantee of $50.00 per year for each 1500 C.P. This minimum offers protection against curtailed use of lamps resulting in reduction of estimated gross revenue.

The Committee feels that the attached table will be of value in determining rates and are indebted to Mr. Rutherford for its use, having been embodied in his flood-lighting paper delivered before the industrial division last November.

Conclusions

1. Gas flood-lighting is profitable load.
2. Has publicity value and excellent load factor.
3. No chronic trouble remains in equipment.
4. Promotion policy should pattern one outlined above.
5. All gas companies are urged to make a trial installation on their own property, for the purpose of securing first hand information on the possibilities of gas flood lighting as a load builder.
6. It is possible to secure "New Load Through Gas Flood Lighting."

TABLE SHOWING GAS RATES COMPARABLE TO ELECTRIC RATES FOR SIMILAR AMOUNT OF INSTALLED ILLUMINATION

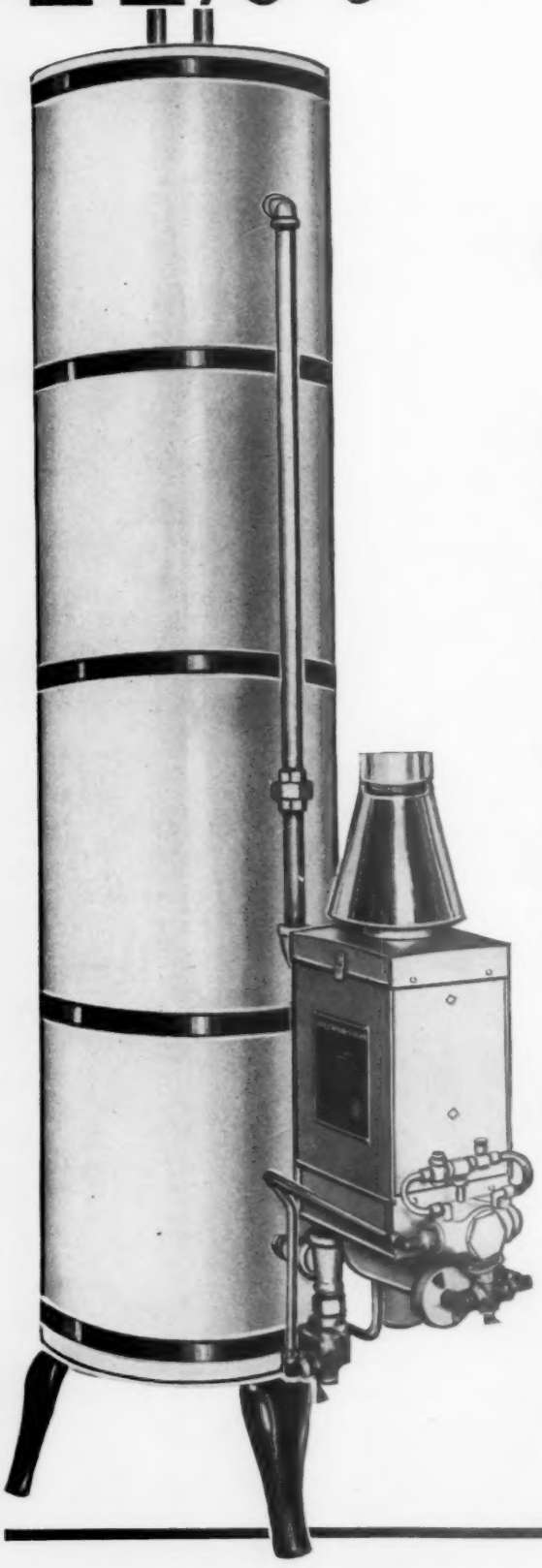
	ELECTRIC					GAS			
K.W.	2000 hr. yr. 4000 hr. yr. Hrs. Mo.	K.W.H. Mo.	Est. De-mand	Rate Per K.W.	Net Total Bill	Equiv. Gas C.P.	C.F. Hr.	C.F. Mo.	Equiv. f. Rate 1000 c.f. Gas
2	167	334	1.00	4c	14.36	3	60	10000	1.43
2	334	668	1.00	3.8c	26.40	3	60	20000	1.32
3	167	501	2.00	3.9c	21.60	4.5	90	15000	1.44
3	334	1002	2.00	3.7c	39.07	4.5	90	30060	1.30
4	167	668	3.00	3.8c	28.40	6	120	20000	1.42
4	334	1336	3.00	3.6c	51.00	6	120	40080	1.27
5	167	835	4.00	3.8c	35.70	7.5	150	25050	1.43
5	334	1670	4.00	3.6c	64.00	7.5	150	50100	1.28

LOCATION OF FLOOD LIGHTS IN NEW ENGLAND

Company	Place	Size 3000 C.O.	1500 C.P.	Total
Bangor Gas Light Co.	Bangor, Maine	2	...	2
Barnstable County Gas Co.	Hyannis, Mass.	45	20	65
	Falmouth, Mass.			
Buzzards Bay Gas Co.	Wareham, Mass.			
Blackstone Valley Gas & Electric Co.	Pawtucket, R. I.	...	2	2
Brockton Gas Light Co.	Brockton, Mass.	8	1	9
Connecticut Light & Power Co.	Middletown, Conn.	...	2	2
Fall River Gas Works Co.	Fall River, Mass.	3	2	5
Greenwich Gas Co.	Greenwich	5	2	7
Hartford Gas Co.	Hartford	...	4	4
Lowell Gas Light Co.	Lowell	23	...	23
Old Colony Gas Co.	E. Braintree	2	...	2
Portland Gas Light Co.	Portland	15	10	25
Springfield Gas Light Co.	Springfield	4	...	4
Taunton Gas Light Co.	Taunton	...	4	4
Ware Gas Company	Ware	...	1	1
Worcester Gas Light Co.	Worcester	12	2	14
	Total	127	50	177

Two fine examples of window display used by Boston Consolidated Gas Co. in their hook-up with the Golden Faucet Campaign.

41% *of the* HOMES



needed an AMERICAN-BOSCH KONVERTO

IN a typical medium-sized Eastern city 41% of the homes have water heaters of the old-fashioned manual type.

What a market for the American-Bosch Konverto! What an opportunity for the gas company to extend the luxury of automatic hot water to these customers. What a chance to increase load; and insure the continued preference for gas as a fuel.

In your vicinity, too, there undoubtedly exists a greater-load opportunity through the installation of American-Bosch Konvertos. Write for new literature about this and the full line of American-Bosch Gas Water Heaters.

Gas Appliance Division

UNITED AMERICAN BOSCH CORP.

SPRINGFIELD, MASS. NEW YORK BOSTON PITTSBURGH

Model WHB 40 Konverto installed on an existing tank results in the compact, inexpensive automatic water heater plant illustrated. Model WHB 75 is similar, although slightly greater in depth. Model WHB 40 consumes approximately 40 cu. ft. of manufactured gas per hour with a recovery capacity of 28 gals. per hour; Model WHB 75 consumes approximately 75 cu. ft. of manufactured gas and has a recovery capacity of 53 gals. per hour.

SITUATIONS WANTED

by these other gas salesmen—sponsored by American-Bosch

American-Bosch Kabinette—the top's a table; the tank's a ball. New, modern, revolutionary.

American-Bosch Ball-Tank Water Heater—the revolutionary automatic gas water heater with the globe-shaped tank.

American-Bosch No-Tank Water Heater—supplies automatic hot water, instantaneously, without a tank or hot water pipes.

Kitchen Planning Helps To Sell the Modern Kitchen

By
Fred E. Kunkel

THE fact that the average kitchen in the home today is the poorest planned room in any house, has induced one gas appliance merchandiser to attack kitchen planning in a more practical manner than has heretofore been attempted.

The average person working an paper and drawing layouts, did not seem to be able to visualize how it was going to look or actually work out, so it was decided to produce something more practical and concrete so that people could more definitely ascertain how a kitchen would actually look after rearrangement and planning.

So he built little miniatures of a refrigerator, range, kitchen sink, broom closet, various sized cabinets, etc., all according to scale, because these objects would show up much quicker than when just laid out on paper.

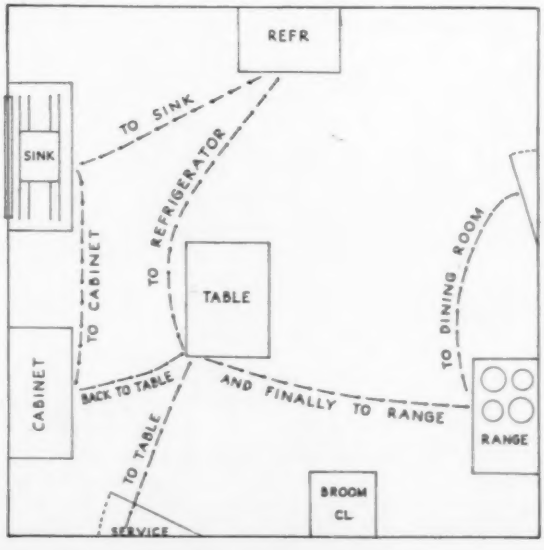
Thus by having a floor plan of the kitchen and placing these miniatures in position, you can quickly see that the refrigerator, for instance, would be behind the door and that would never do. You would also see that you had room to place a coat hanger or broom closet at a certain place.

The first thing he did was to lay out on paper (scaled 16" x 16") a drawing of 16 squares marked off in inch squares. Thus the floor plan is on a scale of 1" to the foot. The miniatures are also on the same scale, so that when a woman comes in with her kitchen dimensions, the floor plan of her kitchen can be drawn on this sheet, indicating doors and windows.

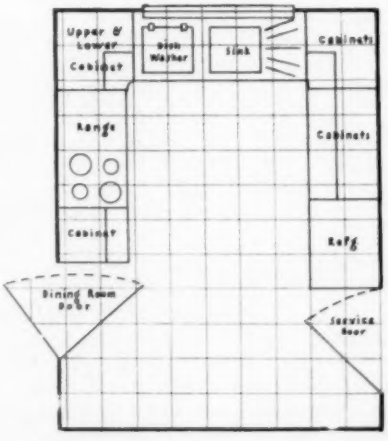
"Then we fit the miniatures into the picture", it was explained. "We place them around until we get the best possible kitchen plan. After we have determined how the kitchen is to be arranged, we give them a sheet containing a drawing of the units in place and indicate what they are.

"These units make it possible for us to work with any one and tell them the principles of kitchen planning, so they won't go too far astray, and we always let them feel that they had part in planning their own kitchen, which naturally makes for more enthusiasm.

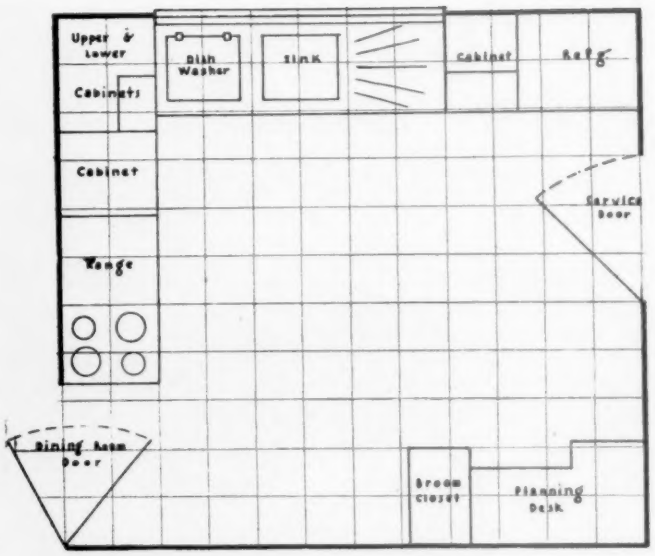
"We have four layouts, because all kitchens come under one of four heads. The best kind and first to mention is the 'U-shaped' kitchen, which has one or two doors which are at the same end of the room,



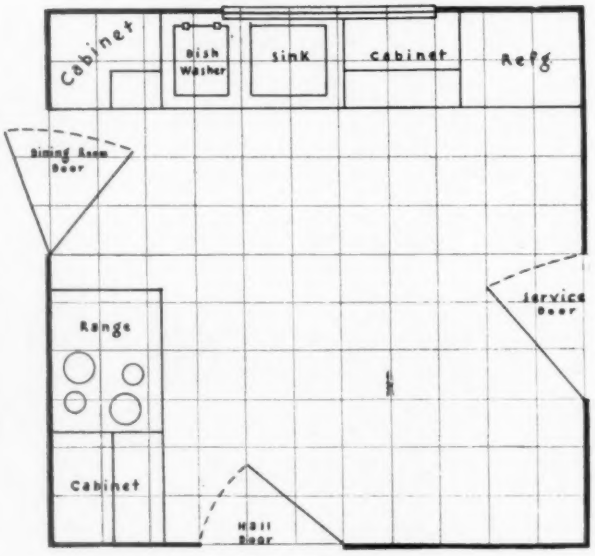
To the left—the poorly planned kitchen. The housewife "Marches On," wearing out her patience, shoes and flooring, taking a "Cook's Tour" three times a day.



Plan No. 1, U-Shaped Kitchen.



Plan No. 2—L Kitchen.



Plan No. 3—Broken L Kitchen

and so give you an unbroken U of wall space. In this type we generally place the refrigerator at the right hand side of the door by the sink and the range goes on the left hand side close to the dining room door. This arrangement is supplemented by cabinets all around to give you a straight continuous working surface.

"The next best kitchen is the 'L-Kitchen' with two doors or more, in which one door, usually the service door, breaks the wall surface so that it doesn't allow any space for the range or refrigerator, but leaves one adjoining wall, or part of one.

"In that case we generally place two of our working centers usually on one wall, and those two centers are the refrigerator and sink, with the refrigerator close to the service door. Thus we can turn the corner to the cooking center with an unbroken sweep of wall space.

"The thing we always want to remember is to have our refrigerator convenient to the other side door, and the range convenient to the dining room, and to try to have your sink unit in between with as much continuous working surface as possible. In connection with the L-kitchen, it often gives you a spare corner in which you can have a breakfast nook or planning desk, or window seat. It always gives you some little corner to use.

"Then we have the Broken L-kitchen, which is very similar to the other, except for an intervening door. There is a break between the cooking center and the range, or any other two units, because of the architectural construction of the room, but we still keep the same order of arrangement . . . in sequence of work. That is, we have as much continuous working surface as possible. In no case do you want to have any item or piece of equipment broken up but always have some working surface and some cabinets in connection with each piece of equipment.

"And the fourth, or last type of kitchen, is the one with four doors in which case it is not possible to put in two units adjacent to each other, so we separate each working center, that is, we have either cabinets or working surface."

This plan is all laid out on a table (3′ x 5′) and tacked against the wall in back of the table is a large poster telling the story, viz:

DO YOU TAKE A COOK'S TOUR THREE TIMES A DAY?

Save Steps—Save Time

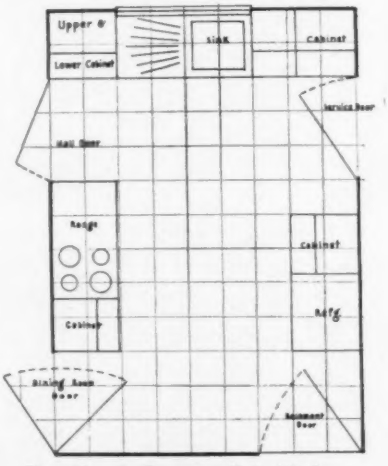
By Properly Planning Your Kitchen.

You need not walk a mile to prepare each meal. Straight lines are still the shortest distances between three points.

Does your kitchen contain three working centers? Refrigerator and preparation . . . sink and cleaning . . . range and cooking?

LET US HELP YOU PLAN A TRULY MODERN KITCHEN

"The three principal advantages of this particular set up," it was explained, "are (1) it doesn't take a huge advertising campaign behind it to put it across, and it doesn't cost very much to start it; (2) it puts us in the position of providing a means through which the individual prospect can design her own kitchen. That is, we are not saying to her, 'here is what we recommend', but she actually participates in this planning arrangement and has a part in it, and because we are right here and working with her all the time, she is able to express it herself; and (3) it gives us an opportunity of explaining why this arrangement is preferable to this or that. We get a chance to sell the idea instead of saying, 'you just give us the print of the kitchen and we'll give you a plan.'



Plan No. 4—Separate Unit Kitchen.

"We have found that people are very appreciative of this helpfulness and we are able to explain the various steps of why they do this and that. With the miniatures it gives her a complete idea of how much room they will take up, and it is a very practical way to do it. If they want something more than a rough sketch, we will make it up and mail it out to them."

POINTING OUT TO YOUR CUSTOMERS *that*

wasted heat means wasted $$

ARE overheated steam tables WASTING YOUR MONEY?
Surveys show that too many steam tables consume more fuel than needed! In almost every case savings were made by replacing with modern tables equipped with Robertshaw thermostats—or by installing thermostats on the tables in use.
Cut your costs WITH
ROBERTSHAW STEAM TABLE THERMOSTATS
Stop the waste that's going on at your steam tables! Check up and see how Robertshaw thermostats will cut fuel bills. Your gas company or equipment dealer will gladly make the survey.
Robertshaw-equipped steam tables actually save their cost in fuel reduction alone! That's the experience others have had. That's the experience you will have. In addition they prevent overcooking; loss of flavor; food spoilage.
Every day you delay means money out of your pocket. Ask your gas company or equipment dealer today.
ROBERTSHAW THERMOSTAT CO.
YOUNGWOOD, PA.
ROBERTSHAW
ROBERTSHAW STEAM TA
THERMOSTATS
Cost So Little—Save So Much
FOR STEAM HEATED AND GAS FIRED STEAM
ROBERTSHAW

"Stop that waste of heat!" That's the warning that Robertshaw advertising flashes to your customers. *"Stop it with Robertshaw thermostats"* is the advice it gives. *"Have an equipment survey made in your kitchen"* is the action it urges—over and over again.

Install steam tables equipped with Robertshaw thermostats or convert those in use with Robertshaw controls available for that purpose.

The savings made by such installations have often resulted in sales of additional new equipment. In many cases complete kitchen modernization has eventually followed.

ROBERTSHAW THERMOSTAT COMPANY
Youngwood, Penna.

Your customers see heat going to waste over their tables. They see it again in the Robertshaw advertising. They see that Robertshaw steam table thermostats will stop that waste. Cash in on this strong promotional campaign. It's running now in your customers' trade papers.

ROBERTSHAW steam table THERMOSTATS

Cost so *little*—save so *much!*

Merchandising Today

By
William Seely
President, Osborne Company

NO ONE within the sound of my voice needs to be given a definition of merchandising. It means the marketing of a product or service which includes the advertising and sales promotional effort entering into the sale of that product or service.

I'm not going to say to you that merchandising today means doing something entirely different to the things that our predecessors may have done. I am not going to outline some long, complicated procedure that would require every merchandiser to be a circus performer to be successful in 1937.

Basically, in my judgment, the principles of successful marketing are eternal. I'm not going to discard forthrightness, sincerity, clarity, persuasiveness, friendliness,—all the elements that yesterday, today and tomorrow are definitely requisites in your business and mine.

Yet, I would not have any man think for a moment that I am so feeble-minded that I do not recognize all that has been going on about us. There is no place on the ladder that reaches success-ward for the man or the woman who is unaware of his present-day world. It's a very different world to what it was, for instance, twenty-five or thirty years ago. Neil Clark in a discussion of "These Tremendous Years" pointed out the other day that we need to go back only a few years to discover a situation where no man's voice, for example, could reach more than a handful of listeners at any one time. Tonight any man or woman, speaking over a radio can reach the entire world. It is estimated that when the Duke of Windsor spoke his 538 eloquent words of abdication, they were heard by over five hundred million listeners,—heard immediately, distinctly.

The talkies, the newsreel, streamline trains, air-conditioned stores, air - conditioned homes, modern streamlined automobiles surpassing anything that has ever been operated on wheels,—these are just some of the thousands of products that have come to make life pleasanter for all of us, at least, they have come to make life more interesting. And certainly they have, in no small measure, affected the world in which we live, become factors in determining our merchandising methods in this year of grace.

I'm not going to call the roll of aviation nor tell the story of long-distance telephoning, go into a discussion of the myriad things that have become a part of our everyday life in these recent years. The very purpose of our meeting tonight is a direct development of these tremendous years. Today, it is our privilege to sell not just a humdrum household or industrial service to build up gas consumption. Because great men have lived, because inventive geniuses have functioned so marvelously during this generation, we meet in sessions like this to help one another to develop plans for selling a service that is intended to give long life to lovely home interiors. We are here to discuss with one another methods of selling comfort, happiness and good health because these are the products of the services and appliances that it is within our power to market. The home heated by gas is free from dirt and filth and dust and smut. Therefore, when we sell the perfected gas home-heating of today, we are selling an insurance policy on the draperies and paint and wall paper of the homes we serve. We are selling, in no small measure good health, freedom from the irritations that go along with coal dust and oil smut.

"The real weakness of the merchandising of the gas industry today lies in the failure to maintain the ground that has been captured."

When we sell the silent, effective, economical gas-operated refrigerator, we sell another great measure of comfort and home happiness and make a definite contribution to good health.

And all that I say about these particular things applies to the case of automatic hot water and to many other fine contributions that the gas industry is making to the daily life of our people. There is a thrill in feeling that the business which we operate is a great public servant, enriching many lives, lifting many burdens from housewives.

What I'm about to say hasn't anything to do with the question of merchandising but I cannot go on without making one statement that many of my friends have heard me make before: I want to say to you that I believe the pendulum in this country is going to swing again. I believe that it is swinging now. The demagogic, vicious, unwarranted effort of the political fakers to discredit business will run its course. If you and I will believe in the businesses in which we work, if we will believe in ourselves, if we will believe in each other, if our pride and faith are made manifest every day in our work and among our friends, this country will yet see a return to the day when men in public office will be proud to pay tribute to the industries of America which have made our nation great. I sincerely believe that we who round out our normal expectancy will live to see the day when once again the crackpot political grafter will be driven from power and government, will encourage business rather than persecute it.

As I said, my comment on the crackpots has nothing directly to do with my subject. I'm sure you will forgive me for this digression, but I bring it up because I urge upon every man engaged in business that he continue to be proud of the work he is doing and that his pride shall be a militant force in his daily undertakings. That's just as vital to successful merchandising today as it ever has been.

In mentioning three significant developments in the past fifteen years affecting advertising, Bruce Barton offers the phenomenal success of the New York Daily News as one of them. That's important because Barton goes on to show that the Daily News built up the largest daily circulation in America and yet built it without taking circulation from other papers. In other words, he says that the publishers of the

Presented at the New York-New Jersey Regional Gas Sales Conference, Rye, N. Y., July 10-11, 1937.

Daily News found millions of newspaper subscribers who had never before, apparently, bought a newspaper. Plenty of pictures, not much language, made the New York Daily News. That undoubtedly is an important symptom of one great group of people whom you or any other merchandiser must reach. Barton points, too, to the so-called comic strip treatment in advertising, a development of the "funnies." Undoubtedly this is an outgrowth of the moving pictures. This offers still further evidence of the fact that people are picture-minded.

The third most significant development of these fifteen years to which Barton points is the radio. These are just some of the changes that have to be taken into account when advertising campaigns and merchandising programs are worked out.

A little while ago, I tried to emphasize the importance of thinking about this gas business not as the job of increasing gas consumption by so many cubic feet, but as a job where we are selling objectively to our people and selling them beauty and comfort and good health and all the other attributes of a home that has been thoroughly equipped with modern gas appliances.

The rest of the world is just catching up to the gas companies in one particular. Public utility corporations years ago, conceived the idea of placing gas appliances within the reach of people on a monthly payment basis that was and is reasonable and easy. Today, people buy everything from $10.00 radios to $5000 motor cars on definite instalment payment basis, and they do it without blushing. It is a part of life.

Your companies were pioneers in this plan of merchandising. So far as I know, there has never been any racketeering by any utility company in connection with this plan of instalment selling. It has always been exactly what it was called, a fine, simple, economical easy payment plan for the consumer.

Undoubtedly, one of the difficulties with the merchandisers of today in the gas industry is that they take this instalment buying arrangement for granted, they overlook its tremendous value as a selling plan. The buyer of your appliances, who is your gas consumer, is subjected to less indignities, less penalties, less embarrassment than the purchaser of any other product that I know anything about which is marketed on an instalment basis.

I urge upon you that, in facing the problem of merchandising today, you get a rebirth of interest in your simple instalment plan of selling, that you become enthused anew over this service and adopt some clever arguments used in selling other equipment, the forthright arguments that have been so effective. Every one of you has seen on billboards, magazines and in folders and other forms of direct mail that tremendous campaign of Pontiac automobiles "Only 15c a Day More." All the human interest arguments were brought up in the pleasant, effective objective selling that was used by Pontiac in this connection. Mother appeared in the ads discussing it with the family, saying that she didn't know that only 15c a day more would enable them to own a Pontiac as against a car that obviously was very much less desirable. Father, the children, the debutante, the young married couple, —all of them sang the song of "only 15c a day more." That reflects the measure of importance that advertisers and merchandisers of 1937 attach to the thorough development of this question of instalment buying.

"The place to look for increased sales is in the homes and offices of your present customers."

Great banks throughout America today are definitely going into this small loan field. All merchants apparently now recognize that it is necessary to let people "pay out of income." By an arrangement with the Morris Plan Bank, R. H. Macy & Company have announced that purchases in their store can be financed and paid for on a time program. That's a final surrender by one of the largest department stores in the world, a store that until now has never considered the question of credit with any man from John D. Rockefeller down to the office boy. If Mr. Rockefeller wanted to buy and have his goods delivered, he either had to give cash with his orders or have them sent C.O.D. That was the Macy plan, and upon that plan, Macy built a business. Evidently in this 1937 scheme of merchandising, that plan is not working as well as it did and R. H. Macy & Company have recognized that there must be some arrangement to permit instalment buying if Macy is to keep up with the procession.

People don't buy a thing merely because it is cheap. Long ago that argument proved to be a poor foundation upon which to rear a great business structure. I come back again to the vital importance of stressing the service that gas can render, the happiness it can give, the constructive economy, the contribution to comfort. That and adequate appliances to make good your claims are a vital part of merchandising today.

What is needed in your merchandising is to instill into the minds of people the absolute conviction that the only place to buy a gas appliance is from the utility company.

I'm not a very good guinea pig. At any rate, I don't think I'm a perfect laboratory case because I happen to have had a cordial association, personal and business, with Bob Koehler, J. P. Hanlon and their associates in Public Service Corporation. Possibly, because of that, I have had the very positive conviction that the only place to buy a gas appliance is from Public Service Corporation. I don't know that it is necessary for me to offer that as part of the argument, because, if you and you and you are good salesmen, you are going to sell to your people that idea, and it is only because the men I happen to know in Public Service are naturals in salesmanship that this idea has become firmly fixed in my mind and in the minds of those in my home. If somebody came along and told me that I could get a Blue Seal stove for $49.00, it wouldn't interest me. I would immediately, or Mrs. Seely would immediately take up with Public Service Corporation the question of our needs, would ask for advice, and would follow that advice. It seems to me that while I may not be a perfect guinea pig in considering this laboratory problem, my situation presents perfectly what the gas industry must do if it is going to fulfill its destiny and enlarge its sales of gas through the use of proper appliances.

Doesn't that situation clearly show what every one in the industry must do? Isn't it clear that the real weakness of the merchandising of the gas industry today lies in the failure to maintain the ground that has been captured? I should not be left open to the successful sales attack of the electric range manufacturer or the utility company representing that electric range manufacturer or the department store representing that electric manufacturer. I should be nurtured and cherished and looked after by the gas company. Some one, some time, should come to my home and ask me if everything

is O.K. With the development of new appliances, with the improvement of heat regulation and insulation, isn't it reasonable to suppose that a household like mine that invested perhaps three hundred dollars in a gas range, should be given thought and attention.

It is proverbial and doesn't represent any great new development in 1937 merchandising that the place to look for increased sales is in the homes and offices of your present customers. That's peculiarly true of the gas industry and the electric industry has gone to work vigorously in the homes and offices of the customers of the gas company.

The gas industry is going to be helped by the advertising campaign of American Gas Association and by the research work of the Association. Through such agencies undoubtedly, more and more people can be made to see that the place to look for service is the utility company itself.

I recommend to the consideration of the gas companies, the kind of energy and industry demonstrated by a bonnie Irishman who represents the Lamp Department of Public Service Corporation. Every so often he comes to my home and very apologetically gets to me and sells me the same lamps that I can buy through my company at a discount and I pay him full price for these, usually giving him a cigar in the bargain and buying more lamps than I should. Why? Because that man is so thoroughly sold on Public Service Corporation, so thoroughly sold on his lamps that he doesn't hear me when I tell him that I can buy these lamps through my company purchasing agent. He has told me how foolish it is to go on using old lamps. He has told me that when one lamp burns out on a chandelier to replace all of them and keep those that have not burned out for "emergency." He persuaded me that it is a good way to save the family's eyes. Incidentally, it's a good way to sell more lamps. That man isn't just selling me bulbs. He's selling me a fireside seat, a comfortable chair, a table, the atmosphere that goes with good lighting. He illustrates our problem in the gas industry.

In my business, I feel that every man in the organization from the president to the office boy must be a salesman. I don't see why that isn't just as sound a rule for the gas company. Perhaps that is a rule in all the organizations that are here represented. If it isn't, I strongly recommend it.

Another recommendation I make in this program of merchandising in 1937 is for a closer relationship between the manufacturer of gas appliances and the gas companies that sell these appliances. In the past, from my observation, there has not been enough of this. I've rather gained the impression that some gas men have assumed the attitude of mind that they, the gas men, were supporting the manufacturer of appliances rather than getting the viewpoint that the manufacturer of gas appliances was really enabling them to stay in business because, without this manufacturer's ingenuity and support, gas wouldn't be widely used. Certainly a profitable and important field presents itself in this question of the relation between the sales executives of the gas company and of the gas appliance manufacturers. That can be a big factor in getting more business from your present customers.

"Your job is to correct the attitude in the minds of many, that they must change from gas to electric or some other service in order to get the benefits which they want and which gas alone can give them."

The capable, earnest, enthusiastic men in the gas industry have a big job ahead of them. And it isn't very far ahead of them. It's right here and now. You cannot pat yourselves on the back as you contemplate the sale of two million gas ranges this year. That figure is estimated but, I understand, is fairly sound. I've also found that there is an estimate, however, that you must take into account at the same time, and that is an estimate of 500,000 electric ranges to be sold this year. That's a deadly ratio that is no tribute to the salesmanship of the gas industry.

Day after day, week after week, month after month, the gospel of gas must be preached to a growing public. Every high school class that graduates, every boy and girl coming out of college, every new home that follows the wedding, every house that is built, every apartment building that is opened, every domestic real estate transaction,—all these are of vital importance to the gas manufacturer. They represent definitely the challenge to you to redouble your efforts to acquaint the public with the merits of the wares you sell and the services that these wares will render.

There isn't a gas man within the sound of my voice who will not say unequivocally that gas, when used in a modern gas range, furnishes unequalled cooking service. Every one of you will say positively and with real enthusiasm that no water heating service can equal an automatic gas heater. You will prove to any listener that, in your judgment, gas refrigeration stands alone, in a class by itself. Are you going out to deliver that message in person to the homes of the field you serve? Do you assume that the public knows all this? Are you depending upon your newspaper advertising, on your direct mail advertising, to do the whole job or is some one from your organization dropping in to see that everything is satisfactory about the gas range now in use, to make a free inspection of the automatic water heater? Are your meter readers salesmen? Do your gas bills tell you anything about the habits, the customs, the possible satisfaction or dissatisfaction of your customers?

Your national advertising will go part of the way, but the tremendous job that is yours and must be done as rapidly as possible through your Home Service Department, through your employee personnel, and through all branches of advertising is to sell your people definitely the conviction that gas service when used with modern appliances has no equal. Your job is to correct the attitude in the minds of many that they must change from gas to electric or some other service in order to get the benefits which they want and which gas alone can give them.

As pioneers in intelligent instalment selling, as men dealing with the vital things of home, there is little else that I can say to you about the complexities of merchandising today; you can't expect the architect to do your job for the gas industry. I went into a beautiful home in Englewood the other day and I saw very readily that the architect, an eminent gentleman who had built the house, had been strongly approached by the electrical industry. You've got to enlist the architects, the plumbers, the builders, the realtors, every one else who can influence favorably the sale of gas. But, as I said a moment ago, the architect can't be depended upon to do your job for you. You could make him gas-minded and gas appliance-minded, you can do the same thing with the builder and the

(Continued on page 70)

Industrial Men Enthusiastic Over Gas Fuel Attainments

Information on Important Installations Disclosed at National Conference

MUCH enthusiasm over the outstandingly successful industrial applications resulting from recent gas research and development, as described in a number of highly interesting papers, was displayed at the National Conference on Industrial Gas Sales held in Chicago, June 8-9. This was sponsored jointly by the Industrial Gas Section of the American Gas Association, Ralph L. Manier, Niagara Hudson Power Company, Chairman, and the Midwest Industrial Gas Sales Council with Lawrence R. Foote, Central Illinois Electric and Gas Company, Chairman. Packed with vital information on important gas installations of an almost revolutionary character, this conference marked another highlight in the series of Industrial Gas Section meetings that are held every year.

The highlight of the meeting was the presentation of a practical and ingenious plan for procuring a large segment of the country's power load, which plan was most enthusiastically received. This plan has been in successful experimental operation for some time now and utilizes or substitutes gas engines in plants of various types. While the main purpose of this plan is to substitute gas engines for central plant electrical current, the principal idea developed is to step up power plant efficiency by coupling a gas engine directly to the main motor (induction type) of a plant, and driving the principal load, through the motor shaft with the motor idling. When operating thus the speeds of the gas engine and motor are synchronous. When more power is needed for auxiliary motors or lighting the unit is speeded up and the motor then becomes a generator.

The second day of the conference was devoted to a trip of inspection to several plants where examples of the furnaces described were viewed at first hand.

The Tuesday morning session was opened with Mr. Manier presiding, and a warm welcome was extended to the attending delegates by F. X. Mattenet, vice-president, The Peoples Gas Light and Coke Company, Chicago.

"Application of Gas Radiant Tubes to an Enameling Furnace" was the title of a paper by George W. Parker, Mississippi River Fuel Co., who described the installation at the National Enameling and Stamping Company plant at Granite City, Illinois. This is a conversion job as the furnace was heated with electric elements prior to the installation of gas radiant tubes. Now in operation for a year, savings in fuel costs over electricity total $20,000. This was accomplished with natural gas at 30 cents per 1000 cubic feet and electricity at one cent per KWH. In the same period production increased 20%.

Valuable operating data were contained in a paper entitled "Application of Gas Radiant Tubes to Batch Type Enameling Furnaces" by F. S. Markert, Ferro Enamel Corporation.

The paper, "Application of Gas Radiant Tubes to Galvanizing Furnaces," presented by A. M. Thurston, The East Ohio Gas Co., Cleveland, was a detailed description of a recent installation at the plant of the National Telephone and Supply Co. of that city.

Somewhat of a sensation was created when a short cycle anneal of only 14 hours in a furnace only 60 feet long as against six days formerly with a furnace 400 feet in length was described in a paper which appears elsewhere in this is-

Caught by the nimble photographer during the National Conference on Industrial Gas Sales in Chicago. C. W. Berghorn (left), in earnest conference with H. A. Sutton, Public Service Electric and Gas Co., Newark, N. J.

The Process and Comfort Air Conditioning Committee Meets. Starting left—C. A. McKinney, United Gas Co.; Harold McGrath, Kansas City Gas Co.; W. E. Stark, Bryant Heater Co.; L. A. Bickel (Chairman), Dallas Gas Co.; C. H. Waring, Kansas City Gas Co., behind whom H. O. Andrew coyly peeps out, and L. W. Melcher, Waukesha Motor Co. In the background, a phalanx of Therms and B.T.U.'s.

C. B. Phillips, sales manager of Surface Combustion Corporation is pretty sure of his point as he tells C. W. Gale of Knoxville Gas Co. all about Controlled atmosphere.

Photos Courtesy American Gas Association

sue, "Application of Gas Radiant Tubes to Short Cycle Malleable Annealing Furnaces" by C. H. Martin, Chicago, representing Holcroft and Co., and the Eclipse Fuel Engineering Co. The interest was more than sustained when the delegates visited the plant the next day and viewed these furnaces at first hand.

The afternoon session was opened by Lawrence R. Foote as presiding officer who first introduced R. A. Hastings who read a paper prepared by W. A. Darrah, President, Continental Industrial Engineers, Inc., "Application of Controlled Atmospheres to the Annealing of Copper and Copper Alloys."

An interesting discussion of atmosphere as applied to ferrous metals was then given by William O. Owen, Surface Combustion Corp. His paper, "Design and Operation of Equipment for the Generation of Controlled Atmosphere With Respect To Annealing and Hardening Processes" described a number of installations in various plants.

The plan for procuring a portion of the country's power load was next presented by Ralph S. Wenner, The Ohio Fuel Gas Company in a paper "Report on Gas Engines for Power Generation."

The following morning about 70 delegates started out on an all day inspection trip of installations in buses retained for the occasion.

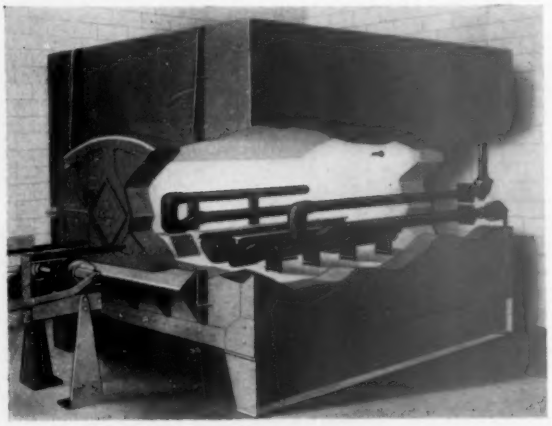
Gas Radiant Tube Enameling Furnace

Quick Comeback After Shutdown Results in Material Savings in Fuel Consumption. New Gas Burner Introduced

by
J. B. Nealey
American Gas Association

THE gas heated radiant or hot tube that recently came into general use for annealing in the sheet steel industry and for other metallurgical heating operations, has now invaded the field of porcelain enameling. Heretofore, furnaces employed for this purpose were, of necessity, of the muffle type, but with the new gas hot tube method of heating no muffle is required as the heating up period is very short. A gas burner of novel design, and of the diffusion combustion type, has been added, and this also helps to increase the speed and efficiency with which enameling can now be accomplished. The gas radiant tube enameling furnace is an outcome of one of the projects of the Committee on Industrial Gas Research of the American Gas Association, of which F. J. Rutledge, of Philadelphia is Chairman.

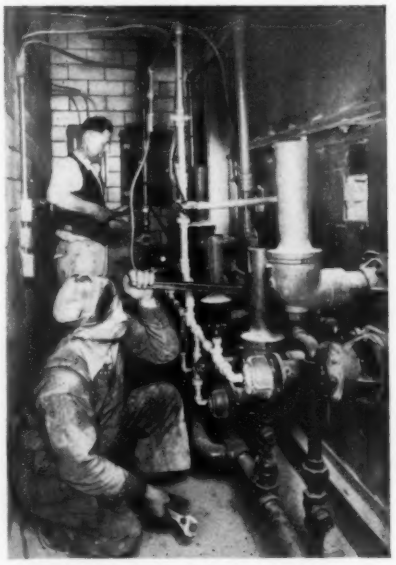
The feature of this system of heating is a series of metal tubes located on the inside walls and bottom of the furnace but with the ends protruding through the back wall to the outside. A gas burner fires into one end of each tube and an eductor at the other end draws the hot products of combustion through. When in operation these tubes become very hot and radiate the heat to the work in the furnace. These hot tubes can be used long after their theoretical life, for the negative pressure inside prevents the escape of the combustion products to the inside of the furnace, should any holes appear in the tube walls.



1.—Cutaway view of gas radiant tube enameling furnace. Note location of radiant tubes together with gas burner and eductor.

Quick Comeback With Gas

One of the advantages of this furnace is that it can be shut down with every assurance of a quick heat up when lighted again. When the plant is not working nights and week-ends, this results in a material decrease in fuel consumption. This furnace is built with lightweight firebrick and the construction gives a very fast comeback after a shutdown. In fact, the gas burners are turned on full when first lighted so that the full thermal capacity of the furnace can be taken advantage of from the start.



2.—Installing gas burners and eductors on gas radiant tubes at back of enameling furnaces. Also automatic temperature control equipment.

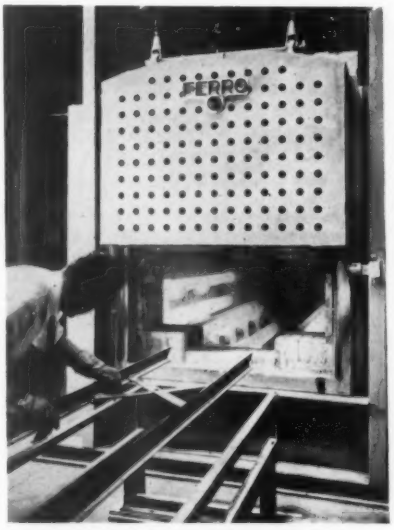
One of these new gas radiant tube furnaces has recently been built at the plant of the Ferro Enamel Corporation, Cleveland, Ohio. This furnace is of the batch type and is 3 x 6 ft. It is equipped with 4 U-shaped gas radiant tubes laid horizontally, 2 on the sides and 2 in the bottom. These are 4 in. tubes with a ⅜ in. wall thickness and are of nickel chrome alloy (35-12), centrifugally cast. The U bend is sand cast separately and the bell and spigot joints are welded in the field. Each tube also has an enlarged sand cast, flat

section for heat concentration which is particularly useful near the front of the furnace to offset door losses. These are also welded to the tubes.

The tube ends project through the back wall of the furnace and the burners and eductors are coupled to them. The eductor is a venturi shaped device, provided with pressure air to pull the hot products of combustion through the tubes. The two top passes of the bottom tubes are used as "pigs" or supports for holding the ware. To these are welded strips of alloy, broken here and there for expansion joints, and the burning bars are laid directly on these. While refractory "pigs" require constant attention, the tubes remain true and undisturbed with all kinds of service.

Novel Gas Burner

A newly designed gas burner of the diffusion type is used with these tubes. It consists of two burners, set in tandem, the first acting as a pilot and the second as the main burner. The pilot has two venturi throats and space for the inspiration of primary air. A gas nozzle just back of the pilot burner fires into and through the main burner. Surrounding the second venturi is a chamber through which the gas flows and is preheated on its way to the four-burner nozzles. The pilot burner and the four gas nozzles which start from this chamber protrude into the end of the alloy radiant tube and the remainder of the air for combustion is drawn in at this point through the action of the eductor at the other end of the tube.



3.—Looking inside a gas radiant hot tube enameling furnace. Note hot tubes on side and bottom.

The gas pressure ranges from 3 to 4 oz. while the air pressure in the eductor is 16 oz. Automatic temperature control is provided in the form of a single potentiometer, thermocouple and motor for all four gas burners. The motor operates on and off valves in the air and gas supply lines which are brought close together, at this point, for this purpose. The pilot lights operate constantly except during periods of suspension of production. Another important feature is that almost any existing enameling furnace can be quickly converted to this method of heating by installing these tubes and gas burners. If of the muffle type, the muffle can be removed.

Application of Gas Radiant Tubes to Short Cycle Malleable Annealing Furnaces*

By

C. H. Martin

Holcroft & Co.
Detroit, Mich.
and
Eclipse Fuel Engrg. Co.
Rockford, Ill.

ALTHOUGH the process of Short Cycle Annealing of Malleable Iron was patented by Holcroft & Company in 1922, it was not until 1934 that the first Continuous Furnace was put into operation. This furnace was installed at the Michigan Malleable Iron Company in Detroit and was electrically heated. The application of electric heat eliminated, of course, the principal scaling gases (carbon dioxide and water vapor) always present in the products of combustion when burning fuel. The electric furnace atmosphere is normally oxidizing but by flowing an inert gas through the electric furnace all oxidizing and scaling agents were eliminated. Thus the elimination of the annealing pots and packing was possible. The old method of annealing malleable iron, whether in the continuous or periodic furnace, was to pack the casting into heavy cast containers that were often filled with packing of some sort and the pot sealed to prevent oxidizing and scaling of the castings. These annealing pots comprised about 60% to 70% of the total weight that went into the annealing oven. This short cycle annealing furnace used light weight cast alloy grid type of trays that were less than half the weight of the pots in the old type annealing furnaces. This reduction in the weight of the trays or containers was the first step in the reduction of the annealing time. In the old type of malleable annealing ovens the total annealing cycle ranged from five to nine days and since the reduction of the weight of the annealing containers would only reduce the total annealing cycle about fifty per cent, it was necessary to change slightly the metallurgy of the iron in the melting furnace to effect further reductions in the annealing cycle. We are, and have been since 1934, annealing malleable iron in a 20 ton continuous furnace with a fourteen hour annealing cycle. Fourteen hours is the total time consumed from the time the iron enters the furnace until it is fully annealed. The annealing cycle is as follows: 2½ hours are required to bring the work up to a maximum temperature of 1700 deg. F.; the castings are held at this temperature for 2½ hours; they are then cooled to 1500 deg. F., in two hours, after which they are cooled more slowly through the critical range for 7 hours, after which they are discharged from the furnace at about 800 deg. F.

With the development in recent years of the Gas Fired Radiant Tube, it became possible to apply gas heat to the malleable annealing furnace and take advantage of all the features developed in the electric furnace, and at a material saving in fuel costs.

During the latter part of March we put into production at the McCormick Malleable Foundry in Chicago a Gas Fired Radiant Tube Short Cycle Malleable Annealing Furnace. This furnace is approxi-

* *Presented at the National Conference on Industrial Gas Sales, Chicago, June 8-9, 1937.*

mately 60 feet long overall and 10 feet wide and anneals an average of 20 net tons of malleable castings per day of 24 hours. The total annealing cycle is fourteen hours and is the same as previously developed in the electric furnace described above. The castings after annealing have an ultimate tensile strength of 58,000 pounds and an elongation of 15% with 38,000 pounds elastic limit. The castings are fully annealed and are free from any scale as they come from the furnace.

The annealing chamber of the furnace is 53 feet long and has three rows of trays. The trays are 20 inches long and 24 inches wide and have sides 8 inches high. The trays, or baskets as they are generally called, weigh about 130 pounds and they hold an average of 260 pounds of castings. The weight of castings per basket varies with the design and cross section of the castings. We have loaded as much as 350 pounds of castings in each tray and consequently the total tonnage annealed per day has varied from 22 net tons to 18 net tons without changing the cycle or the physical properties of the annealed castings.

The furnace is heated with Gas Radiant Tubes as manufactured by the Lee Wilson Engineering Co. The tubes themselves are fabricated from sheet alloy and extend horizontally across the furnace both below and above the work. They are fired with high pressure injector burners using Chicago Mixed Gas of 800 B.t.u. The heating portion of the furnace is divided into two zones. The first zone has 10 five inch tubes below and 8 five inch tubes above the work. These tubes are controlled from one automatic temperature controller recorder. The second zone has 8 three inch tubes below the work and 2 three inch tubes above the work and are controlled from another recorder controller. The third zone which is the fast cooling zone, has 4 four inch fabricated alloy tubes located below the work and 4 four inch tubes above the work. Cold air is forced through these tubes by a fan and the amount of cold air circulated is automatically controlled by a motor operated damper actuated from an automatic recorder controller. The fourth and fifth zones of the furnace are equipped with 12 three inch radiant tubes located below the work and heated with injector burners. Each zone is automatically controlled in the same manner as the first and second heating zones. Thus all portions of the furnace are heated or cooled entirely by radiation and no products of combustion are admitted to the furnace chamber itself.

The castings are prevented from scaling by flowing into the furnace chamber a specially prepared gas from a Holcroft Gas Generator. The generator itself consists essentially of a gas tight combustion chamber, a water condenser, a gas booster and provisions for controlling the mixture of gas and air fed to the burner. City gas is burned in the generator combustion chamber with as rich a mixture of gas and air as can be conveniently burned. The products of combustion are then passed through the water condenser to remove the excess water vapor. In order that the atmosphere inside the furnace remains constant, the furnace is equipped with vestibules at the charging and discharging ends.

The cycle of operation is as follows: Three baskets loaded with castings are charged in the vestibule at the charging end of the furnace and the vestibule door is closed. When the automatic time clock on the furnace makes contact, the main door into the furnace raises. When this door reaches its top position it engages a limit switch which starts the pushers going, which in turn move forward the rows of baskets previously charged. When the pusher returns to its starting position it engages a limit switch which lowers the main furnace door. In the meantime three baskets are pushed out into the discharge vestibule and when the main door at the discharge end of the furnace is closed, the vestibule door is raised and the three baskets with the annealed castings are removed and dumped into containers and removed from the annealing room. The empty baskets are then returned to the charging end of the furnace by means of a gravity roll conveyor where they are again loaded and go through the same cycle.

Since the annealing furnace has been put into operation, a daily record has been kept of the amount of castings annealed and the amount of gas consumed. Based on the average production of 20 net tons of castings annealed per day, using the 14 hour cycle, the gas consumption has been about one and three-quarters cubic feet of 800 B.t.u. gas per pound of casting annealed, including the gas used for the atmosphere generator.

A.G.A. Testing Laboratories Employ Home Economist

Gertrude J. Stanyon, the recently appointed Home Economist for the American Gas Association Testing Laboratories, assumed her new duties in Cleveland on June 7th.

GERTRUDE J. STANYON

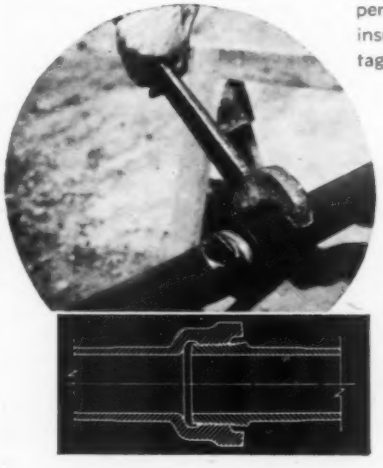
The Laboratories have for some time felt the need of closer contact with the viewpoints of consumers and home economists in its standardization work, certain of its research activities in domestic gas utilization and as an aid in its cooperation with the home service branches of the industry. During recent years there have been increasing demands from university, college and high school Home Economics Departments, for information concerning the Laboratories' activities, for use in household equipment and consumer research classes. This, coupled with the necessity for supplying news releases concerning the industry's testing and approval program to newspapers, magazines, and the Association's national advertising agency, indicates the desirability of giving even greater attention to the consumers' and home economists' points of view.

Mrs. Stanyon's experience in the fields of appliance manufacturing, consumer education and advertising particularly, well qualify her for a position of this kind. She received her Bachelor of Science degree in H. E. from The Stout Institute, Menomonie, Wisconsin, and has done graduate work at the University of Minnesota and at Columbia Hospital in Milwaukee.

She began her Home Economics activities in Wisconsin schools, where she supervised day school and adult homemaking for seven years. Later she joined the Home Service Staff of the Malleable Iron Range Co., Beaver Dam, Wisconsin. For several years she was Home Service Director for the old Fuller-Warren Company in Milwaukee. During the past two years, Mrs. Stanyon's work with the Hutchinson Advertising Co., Minneapolis, has kept her in constant touch with the Home Economics Departments of colleges and universities, women's magazines, utility companies and manufacturers.

INSTALLED *Bottle-Tight* REGARDLESS OF WEATHER CONDITIONS

A sudden heavy rain . . trench full of water . . but the crew goes right on installing bottle-tight joints with McWane 2" *cast iron* pipe. Cast iron asks no odds of climate, clock or calendar . . . requires no coating or coddling . . . no maintenance . . . no replacements. A few pennies more per foot insures these advantages, *all* of them!



The BOTTLE-TIGHT JOINT

This threaded joint, *oversize* and *extra strong*, is always the intermediate joint in factory assembled 18 ft. lengths of McWane 2" cast iron pipe. Investigate!

Sand Cast Inside and Outside

McWANE CAST IRON PIPE COMPANY

BIRMINGHAM, ALA SIZES 1¼" THROUGH 12"

Chicago, Dallas, Denver, Kansas City, New York, Portland, Ore. Salt Lake City, San Francisco, Los Angeles

SERVICE!

★

SERVICE in fact as well as in name. Hundreds of thousands of these Reynolds Service Regulators illustrated at the right are giving satisfactory service. You can be sure that they will give reliable performance over a period of many years.

REYNOLDS Regulators give more years of operating performance and get on the maintenance cost sheet less than any other units on the market. Reynolds policy of manufacture—the thousands of Regulators giving satisfactory performance after years of service is substantiating proof of the ability of these Regulators.

REYNOLDS is glad to co-operate in working out and solving your gas control problems. Write.

★

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Boston, Mass.

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Kansas City, Mo.
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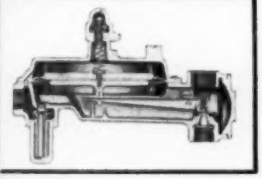
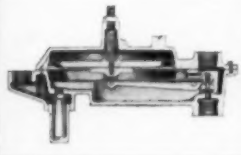
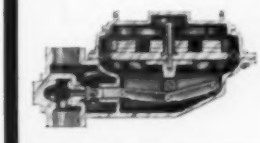


★ MODEL 10
All parts accessible and interchangeable while in pipe line. In spring or dead weight types.



★ MODEL 20
Working parts so accurate as to permit complete interchangeability in shop. In spring or dead weight types.



★ MODEL 30
Is manufactured in either spring or dead weight adjustment for horizontal or vertical connections. All parts accessible while in pipe line.

★

REYNOLDS GAS REGULATOR CO.
ANDERSON, INDIANA, U. S. A.

GAS CONTROL SINCE 1892

Industrial Window Displays for Publicity

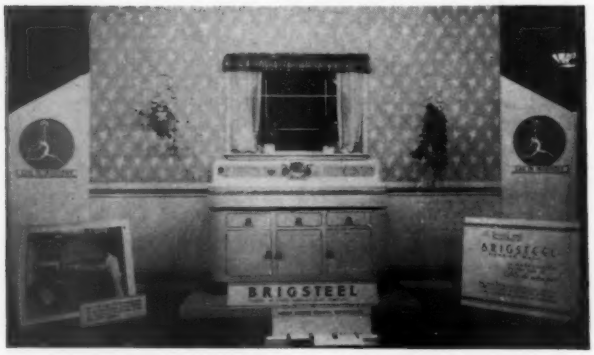


Fig. 2—A new product of striking beauty and exceptional usefulness in every home is made more attractive by a background that simulates a modern kitchen wall. A photograph and descriptive cards tell the gas story.

by
C. Foster Clark

THE industrial gas field offers opportunities for window displays which are seldom encountered elsewhere. The industrial uses of gas are multifarious and this modern fuel finds its way into the making of nearly everything you or I use.

The metal for the safety razor you use first thing in the morning was melted with gas and plated in gas-heated plating tanks; the razor blades themselves were hardened and tempered in gas furnaces. Your morning coffee was roasted with gas and the bread for your toast baked in gas-fired ovens. The plates from which your morning newspaper was printed were cast from a gas-heated

Fig. 1—Spring displays feature pastel colors in the background and seasonal products in the foreground. Photographs of manufacturing operations add interest to the window.

stereotype pot. And the automobile in which you drive to work depends for its manufacture largely upon the use of gas heat; in fact, its engine very likely used city gas for breaking in long before gasoline was placed in the fuel tank of your car.

Almost everything you touch, see or eat during the day had gas heat used somewhat in its process of manufacture. It is readily seen, then, that the field for displays of industrial uses of gas is almost limitless. It is so large, in fact, that we find it necessary to limit ourselves as to the type of material that we use for display purposes.

In planning a program of window displays featuring the industrial uses of gas, it is necessary to bear in mind the three-fold purpose of such displays. They are not only for the purpose of educating the public to the many uses of gas in modern industry, but should also infer from this the usefulness and modernity of gas in the home; in addition, they should improve the contacts of the gas company with its industrial consumers. The success of a display program depends to a considerable extent on the skill with which these three aims are combined in the window.

Suppose we consider a few concrete examples of the foregoing statement. The display of Fig. 1, for instance, was arranged with a local manufacturer of a well-known gas water heater. This display attracted attention by the mounted photographs showing various operations in which gas was used in the manufacture of these heaters and by the actual parts themselves as they looked after each operation. Appropriate window cards told why gas fuel was chosen for these purposes. The display of two colorful heaters themselves, with the attractive pastel background used, acted as a powerful stimulus to the sale of all gas-fired water heaters. And, finally, the showing of this display led to even more cordial relations between the gas company and the manufacturer, since the latter obtained the use of a valuable downtown show window at the best season of the year without a bit of expense to himself.

Another example that might be cited is the display shown in Fig. 2. In this case, the industrial gas story was brought out by a greatly enlarged photograph showing the actual loading of a conveyor rack full of modern steel kitchen sinks into a gas-fired enameling furnace; this was balanced by a large window card on the opposite side of the display, which told how gas enabled the manufacturer to produce a first class product at a reasonable cost. To further emphasize the importance of gas in making this product, a sample piece of steel was placed in the center foreground of the window showing the original steel as stamped into shape, and then the various enamel coats applied to this same steel, each coat baked with gas.

The appeal to the public for the wider use of gas in the home was indirect, as it usually must be in displays of this kind, but was none the less present. The view of a beautiful kitchen interior, displaying this modern and colorful steel sink and cabinet, naturally would tend to create interest in a modern gas range and refrigerator to fill in the picture.

To the manufacturer this display was of especial value, as it was shown in the spring season, when remodeling of homes is at its height, and happened to coincide with the opening of this new plant. That this value was appreciated is shown by the fact that the whole display was borrowed from the gas company for several months to be used as a floor display at the show room of the state distributor of these products.

Of course the great majority of displays do not permit such evident

Fig. 3—Propellers from the record breaking "Miss America",—the world's fastest boat,—were used for their publicity effect in this industrial display.

Fig. 4—Appealing to the mechanically-minded citizens of the "Motor City," this display shows how gas heat can figuratively split hairs when it comes to a question of accuracy.

attainment of the three purposes for which they exist, yet it is possible in nearly every case to obtain these effects, even though it be in a rather subtle and indirect manner. In a display such as the one of Fig. 3, the general story of widespread industrial gas usage was pictured, with no apparent attempt to link it with domestic uses. Yet the generalizing story that gas has many more uses than would be imagined by the man in the street of necessity registers the fact in his mind that gas is modern and progressive and by that much weakens his sales resistance to the use of gas for all heating needs in his own home. In the same way, the company whose products were displayed felt that the indirect benefit of keeping its name before the public, even though its products are not of general retail distribution, was of definite value and well worth the time and effort involved in setting up this display.

It is, of course, true that in order to tell your story of the advantages of gas it is first necessary to obtain the attention of those who pass the window. This is sometimes difficult to do in a purely industrial window, but there is usually some way to accomplish it. For example, in the window of Fig. 3, just described, the attention medium consisted of the prominent display, in a glass case at the front of the window, of the bronze propellors used by Gar Wood in breaking the world's speed record on the water. This not only made use of the name of a local citizen of world-wide fame, but also appealed to the feeling of interest we Americans all have in anything that excels the other fellow—something that breaks the record, for size, speed, numbers, or whatever it may be. The fact that these propellors were made by the manufacturer in question of course tied the attention feature right in with the rest of the display.

In Fig. 4 we have attractive panels containing various precision tools and aircraft engine parts, appealing mainly to people with mechanical tastes. But the story secures attention by stating graphically that an ordinary hair must be split thirteen times to obtain the variation allowed in making these precision parts.

Sometimes we must depend upon seasonability for our appeal to attention, such as a display of holiday fruit cakes just before Christmas time, when one naturally thinks of fruit cakes and plum puddings along with the other trimmings for the Christmas turkey. Displays of this nature as a rule require a more judicious use of color than displays of the type exemplified by Fig. 4 and often offer the opportunity for use of colored lighting effects to attract attention.

If the word "Gas" is kept in front of the potential users in these varied ways, the picture is complete and our displays have served their purpose.

Sell Martin VARIETY OVENS for a PROFITABLE COMMERCIAL LOAD

They bake a VARIETY of goods at the same time having separate thermostatic control for each baking chamber unit. New units may be added at any time.
By the use of a circulating heat system, heat is evenly distributed and they are more economic in gas consumption than most direct heat ovens.
Cake, bread and pastry can be baked at the same time. Their design and finish dress up any bakery, restaurant or kitchen.
They replace other fuels and obsolete gas equipment.
The 2 Section 4 Chamber oven shown is 6'-6" high by 6' deep by 7'-6" wide.

Ask for descriptive data and selling aids for salesmen.

Martin Oven Co.
420 Lexington Ave.
New York

Variety Ovens meet with ready acceptance among the following:—

Bakeries **Restaurants**
Hotels **Hospitals**
Schools **Churches**
Clubs **Chain Stores**

Trends in Sales Training Programs

By
Ralph G. Wells
Director Boston University Bureau
of Business Research

ARE your salesmen using modern stream lined methods of selling, or are they still chugging along trying to make the grade with old fashioned model-T methods?

Like everything else in business, selling methods have changed completely during the last two decades. As a result of scientific studies and experimental work, a complete reversal has been brought about in these methods. I use the words "stream lined" in describing modern salesmanship purposely, to bring to your mind the fact that recent studies of stream lining have proved conclusively that the old-fashioned concepts were incorrect.

Formerly, popular opinion looked upon the arrow as a model and example of ideal stream lining. Today, however, stream lined objects take the form of an egg or an elongated cigar with the blunt end first and the point at the rear. And so in selling, we have completely reversed our methods in many respects. For example, we no longer argue with a prospect.

Modern Sales Methods

Exhaustive studies by such men as Borden and Busse have proved conclusively that selling is not a debating contest, nor the presentation of an argumentative harangue in which the salesman tries to beat down the prospect's defense arguments one by one. That type of selling belongs to the "Gay 90's," or perhaps the pre-war period of the 1900's. Neither is selling a vaudeville stunt, whereby various tricks and devices are used to cajole or hypnotize the customer into buying.

Today, the competent salesman finds thorough, advance preparation far superior to the old-fashioned inspirational, intuitive process of playing a hunch when trying to sell a customer. Selling has become more of a research and engineering process in which methods of approach and presentation are carefully planned and developed in advance upon the basis of thorough study and analysis of the consumer requirements.

Perhaps the most significant change in modern sales practice is a discovery of the fact that the best selling methods conflict with many of the salesmen's natural instincts and emotions. The really successful salesman must learn to subordinate and submerge completely his own natural instincts, in order to draw out the customer and to carry forward effectively the expected sales strategy.

We have frequently been told that a man, to make a good salesman, should be an aggressive extrovert, an enthusiast who enjoys talking about his merchandise and the superiority of his company. Yet, exhaustive studies have proved conclusively that if such a salesman gives free rein to his natural instincts and talks incessantly, he will kill off more sales than he will win by this procedure.

It is only through careful study and practice in the art of self-control that this type of man can learn to achieve that perfect sales strategy in which the customer does most of the talking and apparently "sells" himself. Modern selling is an art with fine points of technique and strategy that can be acquired only through constant study and practice.

If a salesman is to be lifted out of mediocrity, he must school himself in these fine points and learn to submerge himself and his natural instincts completely. There may be such a thing as a natural-born salesman who possesses many native gifts that help him in his work, but these native gifts must be schooled and trained in the right direction to be really effective. Have you ever known any really great musician or artist who has achieved real leadership in his profession without many years of study and practice?

Training Salesmen

Still another point to consider in discussing this question as to whether or not salesmen are worth training is the fact that much of the high turnover among salesmen is due to inadequate preparation on their part and an unwillingness to get down and dig in order to acquire the fine points that really bring success. To me it seems that the real question is whether or not any company can afford not to train its salesmen.

In the gas industry there is a definite limit to the number of prospects located within each company's territory. Each of these prospects is so valuable as a potential source of future revenue that no company can afford to run the risk of allowing an untrained or incompetent salesman to jeopardize future sales by calling on these prospects.

Meeting Competition

Each company must look upon the prospects in its territory as a valuable natural reserve, to be conserved and developed with the greatest care, in order to produce the fullest return over a long period of years. If, through the use of inexpert salesmen, the sale to an interested prospect is lost to a competitor, it means much more than the loss of the single sale, for the competitor—by his superior selling methods—has secured an inside track with the prospect as far as future sales of additional appliances and the consumption of additional fuel are concerned. There is a further danger that when a competitor sells an appliance to one of your prospects it may mean that the purchaser will later remove some of your appliances, and thus reduce his consumption of your product.

After all, salesmen are the medium through which appliances are sold and gas consumption increased. Upon the effectiveness and efficiency of your present sales force depend your company's future sales and earnings.

Regardless of rate reduction, improved appliances, better service, liberal terms, increased advertising, and all the other merchandising factors brought into play by a company, the full benefit of these can be secured only if the company develops a sales force capable of merchandising these advantages and these inducements skillfully.

From a paper presented at Summer Sales Conference N. E. Gas Assn., Swampscott, Mass., June 10-11, 1937.

Because of the vital importance of sales training to every gas company, your Manufacturers Division has developed a comprehensive sales training program designed to help member companies increase their appliance sales. This program, in the process of development for over a year, has been arranged to cover systematically each step in the selling process and to instruct salesmen in the newer trends and advanced phases of selling.

Sales Course in Preparation

There is now in process of preparation a comprehensive training course for gas company salesmen, dealing with each step in the selling process. Two types of text material will be provided for use in connection with this course: one text for salesmen, and the other an instructor's manual and teaching guide.

The special text for salesmen—written in a concise, stimulating style—will contain a resume of modern selling practices which have been found effective in actual use. This text material will be divided into convenient chapters and arranged so that companies may conduct their own course of any desired length or frequency.

Any type of training, to be effective, must be frequent and more or less continuous over a long-enough period to really drive home the fundamentals and essential features, so that they become so thoroughly a part of the salesmen's makeup and thinking that he uses the right methods habitually and automatically, without apparent effort.

Nearly all companies have found that an occasional training course once in five or ten years is not sufficient. Practically all of the large companies, including many of your strongest competitors, carry on their sales training work continuously.

At least once a year all the salesmen should be required to participate in some form of sales training development and activity. No salesman ever reaches the point where he can regard himself as a finished product or an expert who needs no further instruction.

Leaders are Students

Study the history of achievement in any field of life, and you will find that the leaders have been those who have sought constantly to improve themselves through continuous practice and study. It has often been said that, when once a man stops endeavoring to improve his technique, he has stopped growing and is laying the foundation for early decline. In no field of endeavor is this more true than selling.

Merchandising under modern competitive conditions is like a big parade. Through the use of new ideas, new methods, the drive and struggle to secure further sales is ever marching on. To stand still for a minute is to fall behind. There are so many younger contestants eager to win their laurels that they soon overtake and crowd out the laggards and leave them far behind.

Your competitors are straining every nerve to lift the efficiency of their sales force to the highest possible level, and when I use the word "competitors" here I mean more than those who are competing with you in the sale of similar products.

Viewing the Market

In planning our merchandise campaigns and selling methods it is essential for us to realize that the vast majority of consumers live on a limited budget. They have only so many dollars to spend.

When one of your salesmen is endeavoring to sell a product, it is not merely a question as to whether the prospect will purchase your product or the product of your competitor. Oftentimes the paramount issue in the customer's mind is whether or not he will take the money needed for a new car, a new radio, or perhaps sacrifice a much-wanted vacation or trip. Often it goes far deeper than this.

The purchase of your product and the requirement of installment payments may necessitate a reduction in the family's expenditures for food, for clothing, for recreation, and even for medical and health service. Consequently, every firm in this country which is seeking by its merchandising methods to sell anything to your prospect's family is in many ways an active competitor, whether it be a manufacturer of oil burners, of automobiles, or any other household product.

An analysis of the sales efforts and programs of all of the leading companies selling direct to consumer shows that every one of these leaders is giving more and more thought and attention to this subject of training and developing salesmen.

Training Course a Necessity

From the weight of evidence so far presented, it must be obvious that no company—no matter how well entrenched—can afford not to carry on each year some definite program for improving the efficiency of its sales force.

In this connection, I am reminded of an incident that occurred during the deliberations of the Executive Committee of one of the country's largest department stores, when they were considering the problem of putting in air-cooling and air-conditioning equipment. After some discussion on the merits of the new move, the chairman interrupted the discussion with this statement: "Gentlemen, it is not a question of whether we shall put in air-conditioning equipment. The real question is what are we going to do if we do not install air-cooling equipment?"

Perhaps that is the answer to any doubts that you may have in mind regarding the advisability of further training for your salesmen. It is not a question of whether such training courses are worth while, but rather as to what will happen to your sales income and earnings if you don't.

Natural Gas Course in Dallas

Ninety-three Dallas employes of the Lone Star Gas System who completed the 100-hour natural gas study course conducted under the direction of the Texas Department of Vocational Education, received certificates for their work at a banquet in the Dallas Gas Company auditorium May 24.

L. B. Denning, president of the Company, principal speaker at the banquet, urged the students to continue to acquire knowledge in order to be ready for the opportunities ahead.

Using incidents in his own career as an example of the need for constant preparation for the job ahead, Mr. Denning told how he began the study of law at the suggestion of a fellow worker in a railroad car shop.

"It took me eight years to get what I wanted but when the big opportunity came along I was ready for it. I had my sights set on one goal and sacrificed everything else toward that end."

Mr. Denning urged the students, instructors, and others to "keep on learning in order to prepare yourselves for a new era into which the world is entering. The getting of a diploma is simply opening a gate to the future, and training only implies that a man should be able to use the tools of knowledge better than the man who has not acquired them." He defined education as the ability to put acquired knowledge to practical use.

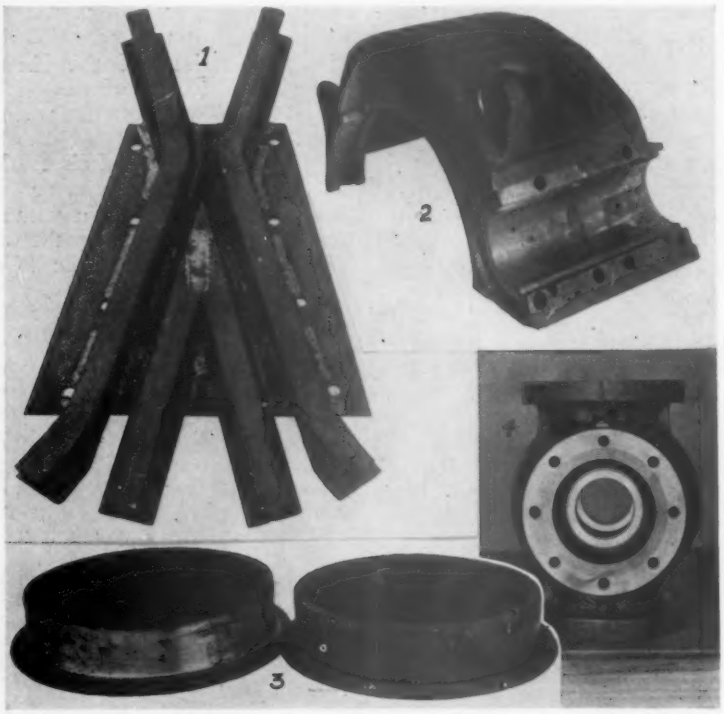
Ten women employes of the company were among those who completed the course.

How Electric Welding Cuts Maintenance Costs in Gas Plants

By
A. F. Davis,
Vice President
The Lincoln Electric Company

This article will cover one tool which, when added to the maintenance department of a gas plant, almost invariably becomes the instrument of large savings in both dollars and time.

The extent to which electric welding is used by gas companies in regular maintenance work is indicated by a list of jobs done in a six months' period by a mid-western gas company. In maintenance of coke ovens, the electric arc was applied to standpipes, suction mains, fuel mains, take-off tees, ells, valve bodies and collecting mains. Maintenance work with electric welding around the oven waste gas stacks included fabricating a ladder to the top of a 200-foot stack, welding the hood inside and out at the top of the stack, applying new rings over old ones at the top of the stack. Maintenance of the company's thionizer included welding patches on one side, welding the band around the top to keep water from running down the side, and fabricating stone pans. In the company's producing plant, the electric arc welded manhole plates in water jackets. In repairing coal unloading hoppers, the electric arc welded loosened seams and put in patches. In coal and coke bin maintenance, patches and partitions were involved and new bins were built. Coal and coke conveyor buckets were fabricated complete. Coke conveyor troughs were patched. A locomotive crane frame boom was repaired in four hours at an estimated savings of $150.00 without dismantling. New side sheets were installed on clam shell buckets and the lips of the bucket were restored to their original size. Such miscellaneous equipment was fabricated using scrap steel in many instances. This work included stairways, ladders, gear guards and other items.



The preceding list of jobs done by electric welding by no means exhausts the possibilities for economical use of the process. Maintenance men, who remember that electric welding can be used on practically any metal, find new uses for the process practically every day.

Accompanying illustrations show maintenance jobs done in gas plants at large savings. Figure 1 shows a track frog fabricated by electric welding. This process enables a saving of over 50% compared with the purchase of a similar unit. As shown in the photo, the frog is electrically welded to a steel plate and the tip of the rail at the wearing point is surfaced with an electrode of manganese steel.

Figure 2 shows the gear case of a small locomotive. The bearings and end bell were built up and faced with weld metal. The total cost of this work is approximately $15.00. To buy the parts new would cost much more.

Figure 3 illustrates the reclamation of car wheels by electric welding. The wheel on the right has been built up by depositing metal with the electric arc and the left hand wheel has been ground to working shape following application of weld metal.

Figure 4 shows an interesting application of electric welding. The casting illustrated formerly had a bushing made of solid stainless steel. This bushing, formerly very expensive, is now made by applying a layer of stainless steel with electric welding to ordinary steel which is used in the balance of the casting.

Health Protection of Welders

A rather complete compilation of present-day information on health hazards connected with welding operations has been made by the Industrial Health Section of the Metropolitan Life Insurance Company in the form of a report entitled "Health Protection of Welders." It discusses the types of welding and lists four principal hazards that are encountered: (1) Electric Shock and Burns, (2) Radiant Energy (roughly classified as ultra-violet rays, infra-red rays and visible light rays of excessive intensity), (3) Gases, Fumes and Dust, (4) Miscellaneous, which includes such hazards as the possible exhaustion of oxygen in the air breathed due to pollution by products of combustion in confined, unventilated spaces. These various hazards are discussed in some detail in the booklet and protective measures are outlined. Methods of treatment are also considered.

Copies of "Health Protection of Welders" are available from the Policyholders Service Bureau, Metropolitan Life Insurance Company, One Madison Avenue, New York.

MAXIMUM USABILITY....

NOW Demanded as the Prime TRENCHER Requirement—
found always in the
CLEVELAND BABY DIGGER—
MODEL 95
The "COMPLETE TRENCHER"

Today's Cleveland "Baby Digger" Model 95 is the complete answer to gas line requirements. So compact and easy to handle that it affords maximum machine-usage in the crowded conditions of cities and towns and yet so rugged and powerful that it handles the most difficult digging with minimum service interruptions.

Quickly and economically transported from job to job on its special trailer.

Let us tell you of the many improvements built into this Model 95 Baby Digger which make it the "Complete" machine for your work. Assures most trench in most places at least cost. Don't delay. Write for details today.

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"Pioneer of the Small Trencher"
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The CLEVELAND BABY DIGGER Model 95

THE GOODMAN STOPPER

The Reliable Shut-Off for Street Mains

Equipped with Improved Patented Locking Sleeve, which locks both handles to the pipe. Stopper cannot slip. Gas cannot pass.

Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, New York

SPRAGUE
CAST IRON GAS METERS
and
REGULATORS
are standard equipment
the World over
Write for catalogs
THE SPRAGUE METER CO.
Bridgeport, Conn.

ISBELL-PORTER COMPANY

Engineers and Contractors for Complete Gas Works

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Manufacturers of All Kinds of Gas Apparatus

NEWARK, NEW JERSEY

Book Reviews

"Air Conditioning in the Home," by Elmer Torok. Published by The Industrial Press, 148 Lafayette St., New York. Fabricoid binding; 296 pages; 6 x 9 in.; 50 illustrations; 45 tables; price, $3.

This book is intended not only as a work of reference for engineers and architects responsible for air conditioning installations, but it is also for all homeowners contemplating the installation of air conditioning systems. It explains the important advantages of air conditioning, the fundamental principles involved, the air conditioning equipment and systems in use, and includes an unusual amount of definite data for everyone interested either in partial or complete air conditioning.

The procedure in designing typical installations is shown by specific examples, and there is a large amount of practical designing data and general information of an original character. Simple drawings or diagrams show the arrangement of different systems and illustrate just how different classes of air conditioning apparatus may be combined with existing heating systems. The advantages and disadvantages of different systems are pointed out.

The question of cost is carefully considered. Typical cost figures for various types of air conditioning equipment are given in a series of tables which include important units, such as steam and hot water boilers, gravity and forced warm air furnaces, conversion burners, humidifiers, unit room coolers, fan-filter and fan-washer units, refrigeration units, attic and kitchen fans and automatic controls.

The first two chapters deal with the benefits, effects, and functions of air conditioning; chapters III and IV describe in detail various types of air conditioning equipment and systems; installation and operating costs are found in chapter V; chapter VI contains a series of 90 questions and answers relating to the principles of air conditioning. Psychrometric tables appear in chapter VII.

Then follow chapters on heating calculations, cooling calculations, the design of the air distribution system, and notes on equipment selection. The Standard Code for the design of mechanical warm-air systems is included, and also a useful table of conversion factors.

Most of the book is written in nontechnical language so that anyone not engaged in actual designing or installation problems may, nevertheless, acquire a large amount of useful timely information.

"Collective Bargaining" by R. D. Bundy, Industrial Coordinator, Board of Education, City of Cleveland, Ohio. National Foreman's Institute, Inc., 60 East 42nd St., New York. 1937. 43 pages, cloth bound. Price $1.00.

The author approaches his subject in an impartial and objective manner. He looks on it as a problem facing both labor and management—one that has been brought about by our changing industrial conditions. Finally he makes certain suggestions as to how many of the causes of misunderstanding between employers and management may be eliminated.

Almost necessarily the author presupposes responsible labor leaders and labor unions which may be trusted to live up to their bargains. He regards the present situation as an "emotional release" which he hopes will pass without permanent harm. (We sincerely trust that his hopes are well founded, that law and order may promptly be restored and enforced, and that the many responsible labor organizations, quietly in existence today may gain in strength and influence, and put an end once and for all to the labor racketeer. Ed.)

A number of specific instances are given illustrating the misunderstandings which may arise between management and employees. Finally, the importance of the foreman, particularly in maintaining harmonious employee relations, is brought out very forcefully.

"Man in a Chemical World" by A. Cressy Morrison. Charles Scribner's Sons, New York, 1937. 292 pages. Price $3.00.

In 1935 the American Chemical Society celebrated the three hundredth anniversary of the founding of chemical industries in America with the largest chemical meeting ever held. The New York section of this great society, through its Tercentenary Committee, which planned and carried out the great anniversary celebration, included in its continuing program the publication of a book, to be written in language that any intelligent person could understand, that would interpret the vital service of the chemical industries in everyday life in terms of human experience.

This is the book. It presents the story of achievement of the American Chemical Industry in a simple interesting way, just as was intended. "Keeping Well," "Feeding Millions," "Wheels and Wings" and "All the Comforts of Home" are a few of the subjects covered.

AGA Annual Awards

The Charles A. Monroe Award, which is made annually by the American Gas Association, announces that applications for consideration for the 1937 award must be received at Association headquarters by August 1, 1937. Award will be presented at the A.G.A. convention in Cleveland during week of Sept. 27th.

The Walter R. Addicks Award for the most meritorious deed during the year will also be awarded at the A.G.A. convention and applications must be filed at Association headquarters by August 1st.

Reverse Flow Process for Salem, Mass.

The Salem Gas Light Company has awarded a contract to the Semet-Solvay Engineering Corporation, of New York, for the conversion of a standard 8-foot water gas machine to use the Semet-Solvay reverse flow process.

The machine will be equipped with backrun and will be enabled to use either gas oil or heavy oil for enrichment. The work will be completed this summer.

Gas Specified for Two World's Fair Buildings

Gas won another victory over competitive fuels this week when the New York World's Fair 1939, Inc., completed specifications for two large buildings to be erected on the fair site, both of which will be permanent structures which will be taken over by the Park Department after the fair closes.

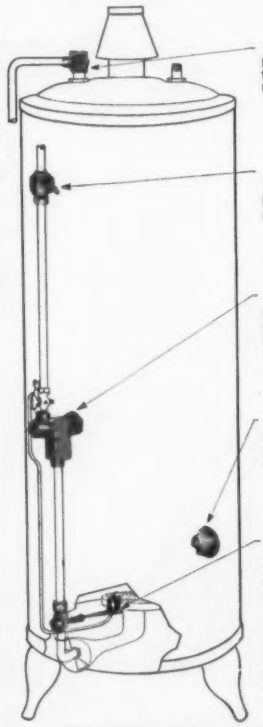
The buildings are the Field House and the Boat House. Specifications which will be issued to bidders provide that both be heated by gas and that gas be used to supply hot water. The buildings are scheduled to be completed about February 1.

Announcement also was made this week that specifications call for all-gas cooking in the Administration Building. This building likewise will be heated by gas and will use gas for water heating.

W. J. MacIntyre Appointed Arkansas Louisiana Manager

W. J. MacIntyre, formerly new-business manager for the Arkansas Natural Gas Corp., has been appointed manager of the Arkansas Louisiana Gas Co., in Shreveport (La.), Texarkana, North Louisiana and East Texas. He succeeds Paul F. McBride, deceased.

For Perfect Control Specify Titan



Titan Relief Valve

Prevents excessive pressure and temperature. Pressure relief at 150 pounds, temperature relief at 200° F.

Titan Safetystat

Automatically shuts off all gas to the burner in the event excessive temperatures are developed.

Titan Snap Action Thermostat

Is an extremely sensitive instrument providing perfect control of water temperature. Equipped with a Temperature Selector.

Titan Nu-Drain

Its compact design provides almost complete concealment of the body. It improves the appearance of any heater.

Titan Safety Pilot Control

Automatically prevents escape of unburned gas from main burner in case the constant pilot flame should become extinguished.

Titan Controls are built to meet the rigid requirements of water heater manufacturers. Catalog and full details on request.

The Titan Valve & Manufacturing Company

Thermostats—Safety Pilots—Relief Valves—Safetystats

9913 Elk Avenue N.E. Cleveland, Ohio

"USING CHACE Thermostatic BIMETAL IN OUR WESTINGHOUSE Adjusto-a-Matic ROASTER GRILL"

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

CHACE THERMOSTATIC BIMETAL

Chace Thermostatic Bimetal is the active element used to automatically maintain selected heat in this new Westinghouse Adjust-O-Matic Roaster—150° to 550° heat. If your product calls for automatic control of temperature or you desire an automatic action at a given temperature—investigate Chace Thermostatic Bimetal.

SHEETS — STRIPS — SHAPES

W. M. CHACE CO.

1610 Beard Avenue - - - Detroit Mich.

Continuous BENZOL *Refining*

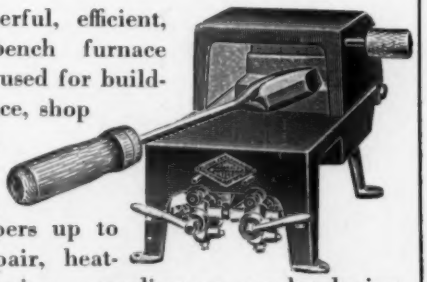
A BENZOL REFINING PLANT, which will be the largest ever built, is being constructed for an American steel company by the Semet-Solvay Engineering Corporation. The installation will employ the Semet-Solvay continuous refining process, perfected over 15 years of operation and improvement in Semet-Solvay's own by-product recovery plants.

● The new unit will deliver benzol, toluol, xylol and solvent naphtha, meeting the strict specifications required by industries using these products.

● From no other source could this customer have purchased an equivalent of successful experience, or such long familiarity with the equipment required. Semet-Solvay invites inquiries of similar character from plants in need of modernization, increased capacity or better yield and uniform analysis of the products obtained.

SEMET-SOLVAY
ENGINEERING CORPORATION
Engineers—Contractors
40 RECTOR STREET, NEW YORK, N. Y.

JOHNSON No. 101 BENCH FURNACE



Here's a powerful, efficient, dependable bench furnace that is widely used for building maintenance, shop and industrial work. Designed for heating, soldering coppers up to 12 lbs. per pair, heat-treating, tempering, annealing or case-hardening any carbon steel tools or small metal parts. No blowers or forced air blast necessary for quick, intense heat. Sturdily constructed and includes many patented and exclusive Johnson features. Heated by two powerful Johnson Direct Jet Burners, each with shut-off valve and pilot light. Write for free catalog.

JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA

New Equipment and Appliances

Mercoid Markets Twin Automatic Control

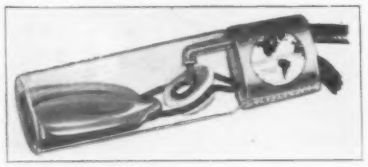
Streamlining of automatic heating and air conditioning units has been influential in the development of the new Type M-80 combination fan and temperature limit control for warm air furnaces, just announced by The Mercoid Corporation, 4201 Belmont Avenue, Chicago, Illinois.

Mercoid Control

This unit has double adjustments which permit individual setting of both the "high" and "low" operating points. The range can be adjusted over the entire scale and the differential can be set for very close operation or can be widened to meet any field requirements. A visible dial is calibrated from 50 to 300 degrees and permits ready reading of the setting which can be quickly altered by removal of the instrument cover. A pointer indicates, on the dial, the temperature in the furnace or duct, thus serving the same purpose as a thermometer on a hot water boiler or pressure gauge on a steam boiler.

Safety and ease of adjustment are predominant in the M-80 Twin Unit which is particularly adaptable to automatic heating installations. The illustration shows the general construction.

The Mercoid sealed mercury switch is the operating medium of this control. It consists of a glass tube containing sealed contacts of special material and a quantity of mercury to make or break the circuit when the tube is tilted. Inert gases, sealed within the tube, stifle the arc instantly so that there can be no arcing, oxidation or corrosion. The M-80 Control Dial automatically regulates the tipping of the mercury switches thus turning on or shutting off the fan or blower at the desired temperature as indicated on the dial.

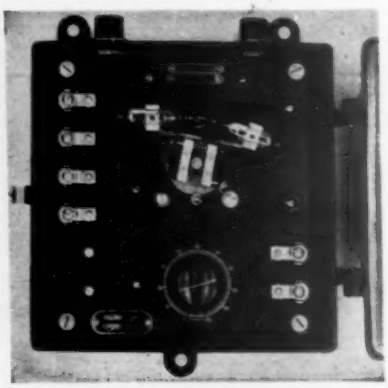


Mercury Switch

"Romine" Range Connection

This self-adapting connection for gas ranges consists of two self-sealing brass fittings and a specified length (3, 4 or 5 ft.) of special aluminum alloy pipe of ⅝ inch outside diameter. Its use obviates the older method of handling cutting and threading of pipe and fittings, so that a range may be

hooked up in two or three minutes at the time of delivery. The semi-flexible pipe adapts itself to any position of the range and is guaranteed not to leak or collapse. Manufactured by The Gray-Wilson Company, 1627 West Fort Street, Detroit, Mich.



Bristol B-Linator

Anticipating Device for Pyrometer Controllers

The Bristol Company, Waterbury, Conn., has perfected a device known as the B-Linator for use with automatic pyrometer controllers such as are used on industrial heating furnaces. The purpose of this device is to enable the pyrometer controller to anticipate temperature changes and correct the fuel consumption long enough in advance to prevent the temperature from cycling or rising above and falling below the control point.

The B-Linator can be used with practically all of the commonly used types of pyrometer controllers and can be added to present installations as well as incorporated in the control circuit of new equipment. Through a switching device it adds and subtracts an emf to the regular thermocouple circuit to cause the controller to act in anticipation of a temperature change.

The varying emf produced by the B-Linator annexes the anticipating feature of the control apparatus, enabling it to maintain a close temperature in the furnace.

News of the Industry

Photo © Chas. R. Laidlaw

Air view of Seattle, scene of the 44th Annual Convention of the Pacific Coast Gas Association, August 17, 18 and 19. Delegates from Pacific Coast gas companies, gas appliance dealers and gas appliance manufacturers will attend the meeting. In the distance, the picture shows Mt. Baker and the Cascade Mountains, famous for their vacation possibilities. The city lies between Puget Sound (foreground) and Lake Washington (upper right).

The Convention of Pacific Coast Gas Assn.

"Shoulder to Shoulder and All for the Gas Industry" will be the theme of the Seattle Convention, August 17th to 19th. Headquarters, Olympic Hotel. As a matter of fact, it has been the theme of Association activities ever since President Pollard announced it as his slogan when he assumed office at San Francisco last Fall. Right now the Association's officers, directors, section chairmen, committee chairmen and members are working to complete assignments and to develop a convention program which will reflect the accelerating tempo of the Gas Industry to the end that the program will be dramatically staged, authoritatively phrased, and seasoned with good fellowship.

General Chairman of the Convention Committee will be Thomas E. Roach, Vice President and General Manager of the Washington Gas and Electric Company. Hostesses will be Mrs. James F. Pollard and Mrs. Thomas E. Roach. Mr. Roach has retained an able group of lieutenants, among whom are the following:

E. J. Ludeman—Entertainment; J. Wilson Gaw—Banquet; L. H. Steele—Reception, Attendance and Properties; Chauncey H. Smith—Hotel Accommodations; Hyrum Crofts—Registration; Frank Cadman—Convention Newspaper; Warren E. Kraft—Publicity; R. W. Coblentz—Golf Tournament; L. S. Davis—Transportation.

Personnel Changes In New Southern California Gas Company

The Board of Directors of the Southern California Gas Company, with which the Los Angeles Gas and Electric Corporation was merged on May 13, has confirmed the appointment of Addison B. Day as Chairman of the Board and of A. B. Macbeth as President and General Manager.

Harry L. Masser, former Vice President and Assistant General Manager of the Los Angeles Gas and Electric Corporation, becomes Executive Vice President and will have supervision over gas distribution and manufacture, division managers, purchasing, rate and valuation, personnel, and accounting departments.

F. J. Schafer continues as Vice President in Charge of Distribution and Manufacture; E. N. Simmons, Auditor for Los Angeles Gas and Electric Corporation, becomes Comptroller of the company, and G. A. Detrick, General Auditor for Southern California Gas Company, continues in that position.

The treasury department will be under the supervision of W. E. Houghton, Vice President. L. D. Romig will continue as Treasurer, assisted by H. L. Phelps and L. B. Wilson.

LeRoy M. Edwards becomes Vice President and Special Counsel. T. J. Reynolds, as Vice President and General Counsel, will continue as General Counsel of the company, performing the same duties as in the past, supervising general legal work, lands and rights of way and tax matters. Neil G. Locke and L. T. Rice will act as assistant counsels. Lands and rights of way will be in charge of Allen M. Cleveland; tax matters will be in charge of R. U. Fitting.

William Moeller, Jr., Vice President in Charge of Natural Gas Production and Transmission, will continue his present duties, with H. P. George as General Superintendent of Production and Transmission, as his assistant. Mr. Moeller also will have general supervision of certain engineering departments, stores and transportation. William Maddock will be in charge of stores with George Knox and Ernest Bullard as assistants. Transportation will be under the immediate direction of P. A. Patchen. Roy Bauer will continue as Gas Supply Supervisor. Ben Laulhere will be in charge of miscellaneous engineering for the Production and Transmission Department and certain other departments.

F. M. Banks, Vice President in Charge of Sales and Advertising, will also have charge of the Customers Department. He will have as his assistants in sales work Frank Weiss of the Los Angeles Gas and Electric Corporation, W. M. Jacobs, General Superintendent of Sales, and J. S. Spaulding as Advertising Manager. O. L. Moore, Manager of the Customers Department of the Los Angeles Gas and Electric Corporation, continues in this capacity with the Southern California Gas Company, and F. C. Ingram, formerly General Superintendent of the Customers Department for the Southern California Company, becomes his assistant. H. E. Davidson will be assistant in the Customers Department.

C. L. Whitehill, Secretary, will continue in that position, with F. E. Seaver of the Los Angeles Company, as Assistant Secretary.

R. R. Blackburn of the Southern California Company becomes General Agent handling claims, insurance and safety; in addition, Mr. Blackburn will have charge of certain divisions of personnel work. Guy W. Wadsworth, Jr., of the Los Angeles Company, continues his position of

CONVENTION CALENDAR

July

1-3—Michigan Gas Association, Grand Hotel, Mackinac Island, Mich.

August

17-19—Pacific Coast Gas Association, annual convention, Seattle, Wash.

September

Week of 27th—American Gas Association, annual convention, Cleveland, O.

October

Midwest Section, National Bottled Gas Association—Cleveland, Ohio, during week of September 27.

National Bureau of Standards — Conference on Corrosion and Protection of Pipe Lines, National Bureau of Standards, Washington, D. C. In October. Definite date to be announced.

Personnel Counselor in the Southern California Company. Daniel L. Scott will supervise the publication of company house organs and direct various phases of employee affairs.

H. J. Kister will continue as Purchasing Agent with G. W. Carbee as Assistant Purchasing Agent. E. H. Wetlaufer will continue as Rate and Valuation Engineer.

J. G. Rollow, Chief Engineer for the Los Angeles Company, becomes Supervising Engineer of the company, having charge of gas manufacturing departments and holder stations. In addition he will supervise the work of the engineering design department, civil engineering and general construction, the latter being under the immediate direction of W. R. Shettel, formerly Construction Engineer for the Los Angeles Company, who continues in his previous capacity.

Lee Holtz continues his position as General Superintendent of Distribution, having supervision of the activities of this department for all divisions. Mr. Holtz will have as his principal assistants, as superintendents, W. M. Henderson and Elting Henderson.

The various Division Managers will continue their former positions; H. C. McAllister as Manager of the Eastern Division; S. C. Singer, Manager of the Northern Division; J. F. Murray, Manager of the Southern Division; George Porter, Manager of the San Joaquin Division; and A. B. Newby, Manager of the Kern Division. District Managers of the Los Angeles Company continue their posts; Geo. S. Campbell in Pasadena; L. E. Green, Hollywood; M. A. Seeley, Huntington Park; Clarence Bates, Alhambra; and C. S. Graves, Inglewood.

Directors will be A. C. Balch, F. M. Banks, Addison B. Day, Garretson Dulin, LeRoy M. Edwards, Stanley W. Guthrie, W. E. Houghton, Harold Janss, A. B. Macbeth, H. L. Maser, Ben R. Meyer, William Moeller, Jr., Stuart O'Melveny, T. J. Reynolds and F. J. Schafer.

Lone Star Gas Co. Completes 28th Year

June is a red letter month in the history of the Lone Star Gas Company, for it was in this month, twenty-eight years ago, that the company which now serves natural gas to more than a million and a quarter people in Texas and Southern Oklahoma had its beginning.

The year 1909 was the starting point in the history of the company. A year previous the firm of Treat & Crawford had acquired large gas acreage in Clay, Montague, Archer, Young and Shackleford Counties and had drilled some gas wells in what was thereafter known as the Petrolia field in Clay County.

On June 1, 1909, L. B. Denning, representing the Treat & Crawford interests, arrived in Dallas to work out details with E. R. Brown, now chairman of the board of directors of the Magnolia Petroleum Company, for a gas pipe line company. On June 4, 1909, a charter was granted by the state of Texas to the Lone Star Gas Company and marked the beginning of the present Lone Star System.

The first long distance pipe line in Texas was laid by this company with approximately 135 miles of 16-inch steel pipe from the Petrolia field to Fort Worth. In February 1910 gas was turned into Fort Worth and in April of the same year the main line, which had been extended to Dallas, brought natural gas to Dallas consumers.

For the first year the company served 15,000 customers, and one well in the Petrolia field was able to carry the entire load and meet all demands during the first winter. Disheartening periods occurred, however, from 1915 to 1924 as demands increased and cold weather found the company without sufficient gas supply. This was due entirely to the fact that the present known gas fields were undeveloped and sufficient quantities of gas simply could not be had. A new field in Southern Oklahoma had been reached with lines, but in two years this field had declined so much that additional sources of supply had become necessary.

Pipe lines were constantly being built to new sources of supply only to have the gas dissipated and exhausted before the line was completed, or shortly afterward.

Only great faith and courage and a sense of loyalty to their original purpose kept the company going during the darkest days of 1917 when an inadequate gas supply, lack of money and materials and limited credit was brought on under stress of war conditions. And shortage of labor was not the least of their troubles. Car loads of Mexicans from San Antonio were brought through Fort Worth to the fields only to walk out after first getting a square meal at the grub tents. Hunger satisfied, many of them never touched an implement handle.

The tide of adversity was eventually turned for the staunch little company when in 1924, engineers perfected a method of utilizing casing-head gas being blown into the air from absorption gasoline plants in Eastland and Stephens counties. From that time dates the company's success.

From some eight or ten wells, 15,000 customers, and 135 miles of pipe line in 1909, the Lone Star Gas Company and its affiliate companies has grown in twenty-eight years, into a system of some 4,000 miles of main lines, 1,000 wells in thirty-one separate fields, 300,000 customers, and over 4,000 employes.

Blue Blaze News, June, 1937

New Natural Gas Supply in California Transmission Lines to be Laid

The Pacific Gas and Electric Company is about to increase its supply by tapping a new natural gas field near Rio Vista, Solano county. Ten million cubic feet daily from this source will supplement the enormous quantity it now draws from Kettleman Hills.

Rio Vista gas will be distributed by the P. G. and E. in Solano, Yolo, Marin, Sonoma and Napa counties.

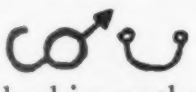
To this end the company will construct 58¼ miles of steel, high-pressure transmission pipelines as soon as authority is received from the Railroad Commission. The project will cost $904,000 and will be completed in about three months.

A 12-inch main, 5¾ miles long, will be laid from the Rio Vista field to a point south of Dixon and east of Fairfield and Suisun. From there a 10-inch line will extend 26 miles to the Napa "Y" Junction on the state highway where it will connect with the existing pipeline that now brings Kettleman Hills gas across the Carquinez Bridge to the North Bay territory.

Another 10-inch line, 14½ miles long, will connect the 12-inch Rio Vista main with the 6-inch line already in service between Dixon and Davis. From Davis an 8-inch line will run 12 miles north to serve the recently-built beet sugar refinery of the Spreckels Sugar Company, two miles north of Woodland.

The new natural gas field is in the Montezuma Hills, west of the Sacramento River and two miles from the town of Rio Vista. The discovery well was completed on June 19, 1936, by the Amerada Petroleum Corporation, which now has six producing wells in the area and plans to drill more. The Standard Oil Company has brought in one well nearby.

Development of the Rio Vista field and construction of the new network of mains will enable the P. G. and E. to meet steadily-growing demands for natural gas, to extend service to communities not now served and to conserve the gas resources of Kettleman Hills.



No, it isn't hieroglyphics or the name of a Greek fraternity. It's simply the ancient alchemist's symbol for IRON OXIDE FOR PURIFICATION. The modern symbol is

GPM
IRON HYDROXIDE

GAS PURIFYING MATERIALS CO. Inc.
L. I. City, N. Y. & Providence, R. I.

Broiler Problem Solved

Kennedy Radiant Broiler—The Answer

Proof: In daily use for over a year by several hundred leading hotels, restaurants and clubs. Customers include:

Waldorf Astoria	**Schrafft's**	**Union Club**
New Yorker	**Longchamps**	**Lawyers Club**
Fifth Avenue	**Foltis Fischer**	**Knickerbocker Club**
Astor	**Broadway Hofbrau**	**Merchants Club**
Ambassador (Atlantic City)	**Union News**	**Montclair Golf Club**

These broilers have three conquering sales arguments: Economy! Efficiency! Delicious Cooking!

Economy: Laboratory tests show consumption of 105 cubic feet per hour with the Kennedy Radiant Broiler as compared with 160 to 250 cubic feet per hour of other makes.

Efficiency: The usual broiler requires 45 minutes to bring to broiling temperature—the Kennedy Radiant Broiler requires 5 to 10 minutes.
The Kennedy Radiant Broiler is the overhead type, constructed on scientific principles, maximum accuracy, producing a highly concentrated incandescence, extraordinarily rich in penetrative radiant heat rays, uniform heat from the entire Radiant surface, producing rays of the required intensity.

Delicious Cooking: The rays quickly seal the surface, holding in the juices and yet penetrate the meat so thoroughly that a uniform rare cut may be quickly prepared, without being raw in the middle. The action of the rays on the meat fibres results in making tender, instead of toughening—a great factor in thin slices.
The product is superior—juicy—succulent—delicious. Incidentally as a bread toaster, the Kennedy Radiant Broiler has no equal.

●

The broilers are designed by Walter Kennedy, well known to the gas industry.

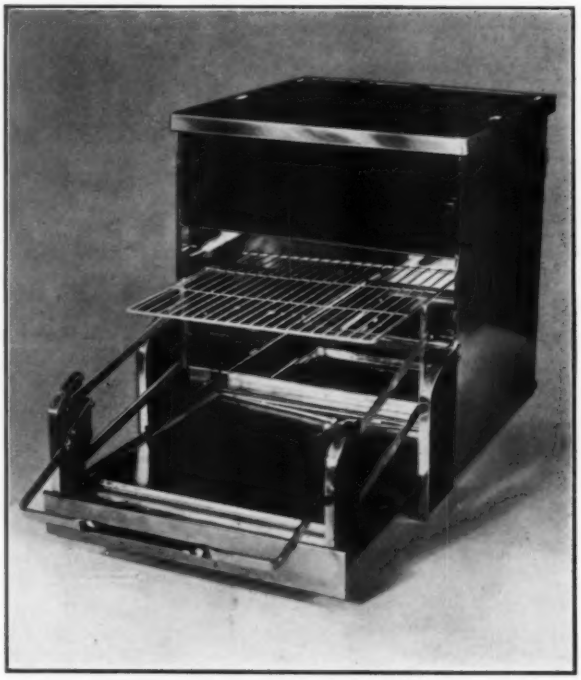
Made in three types: For broiler (a) 4 burner replacement, (b) 2 burner for Salamander, (c) counter broiler.

●

For full information

Radiant Equipment Corporation

1728 Grand Central Terminal Bldg. **New York**



The counter broiler is handsome in appearance, designed for quick service, so constructed as to operate practically without smoke—has improved type of adjustable rack, making equally efficient the cooking of fish and meats.

REPEAT
is the Highest Test

After using one of the Kennedy Radiant Broilers (Conversion Units) for over a year, Schrafft's recently placed an order for 54.

$1000 (AND UPWARD) REWARD

FOR 10 MINUTES OF YOUR TIME

Savings that run into the thousands are well worth a moment's investigation. And, we ask only a 10 minute interview to definitely establish that

...Lavino "Activated" Oxide is no higher in initial cost, yet

...with it, you save on cost of handling, and

...it will cut your gas purifying costs by removing a greater amount of H_2S, and by purifying a greater number of cubic feet of gas per pound of "Activated".

May we have that ten minutes? Just mention the time in your note to—

E. J. LAVINO AND COMPANY

CHICAGO 1528 WALNUT ST., PHILA, PA. PITTSBURGH

For

OIL *and* GAS

under High Pressure

CF

You can handle pressures up to two thousand pounds under perfect control and pass on to your distributing lines whatever reduced pressure may be called for, by use of the proper C-F Regulators. There are standard regulators for all pressures up to 600 pounds—for higher pressures designs are adapted to suit specifications.

The Chaplin-Fulton Mfg. Co.

28-40 Penn Ave. Pittsburgh, Pa.

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ADJUSTABLE BELL JOINT LEAK CLAMPS
Pittsburgh Equitable Meter Co. 274

ALL IRON GAS VALVES
Isbell-Porter Co. 156

ANTI-VACUUM AND BACK PRESSURE VALVES
Connelly Iron Sponge & Governor Co. 232

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S. R. Dresser Manufacturing Co. 239

AUTO VENT BACK PRESSURE VALVES
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(Continued on page 62)

Red White & Blue Water Heater Campaign

The novel water heater sales contest staged in Southern California February 22 to April 30 was successful from all points of view. The major purpose of the contest was to stir the interest of dealers in pushing the sale of serviceable water heaters and to this end water heaters of specified grades were tagged by manufacturers. The dealers returned the tag stubs from heaters sold to contest headquarters and thereby earned points good for merchandise prizes.

The Natural Gas Bureau, which conducted the contest, reports that 313 dealers returned stubs reporting the sale of 3,250 qualifying water heaters. These heaters were divided as follows:

White Tags (heaters $50.00 to $62.49)	1513
Red Tags (heaters $62.50 to $74.99)	900
Blue Tags (heaters $75.00 and over)	837
Total	3250

The high point winners were well distributed over Southern California, among the first five being dealers in Los Angeles, San Pedro, Alhambra and Eagle Rock.

Nearly all utility companies make an effort to collect sales information from dealers and a number have achieved a substantial degree of completeness. A review of utility figures indicates that at least the following number of appliances were sold on the Pacific Coast during 1936.

Ranges (about 1 per cent of these were hot plates and cookers)	152,000
Water Heaters (about 15 per cent of these were non-automatic)	122,000
Central Heating Plants (mostly warm air furnaces, including conversions)	20,000
Space Heaters (approximately 50 per cent floor furnaces, 40 per cent circulators, the balance being radiant heaters, wall heaters, radiators, etc.)	185,000
Gas Refrigerators	23,000

It is estimated that while well over 80 per cent of retail appliance sales in this territory are made through dealers, an inverse proportion applies to advertising, solicitation and other features of sales promotion. In other words it is the sales effort and advertising of the gas companies which have created this big business for the dealers.

Gas Appliance Sales at Brooklyn Union Gas Co. Set All-Time Record

A demand for modern gas appliances which surpassed all previous records was experienced by this company during the first five months of this year, it was revealed recently with the announcement that total sales for the period exceeded 1¼ million dollars.

The best previous record was $1,042,719.12, that being the total for the first five months of last year. The current year's sales, which aggregated $1,255,572.42 were higher by $212,853.31, or slightly more than 20 per cent.

Kansas City Goes Over the Top on Water Heater and Range Sales

The second intensive month's campaign on automatic storage water heaters in The Gas Service Companies got under way June 1 with favorable prospects for one of the largest water heater campaigns ever to be staged by the new business departments.

April and June were chosen as the two months this year for water heater campaigns, the campaign in April resulting in sales and rentals of 1,144 heaters, all of these being installed during that month.

In the April campaign there were 543 sales of new water heaters and 601 rental contracts made in the various company properties.

The same set-up prevailed in the June campaign as was in effect during the month of April. From June 1 to June 12, inclusive, 262 outright sales of water heaters were reported. During this same period 206 water heaters were added to the company lines under the rental plan in the various properties. Sales from rentals during the first two weeks of the June campaign amounted to 405.

The New Business departments on May 31 completed an unusually successful range campaign which brought sales and installations of 1,675 gas ranges during the May campaign. This was the second monthly range campaign of the year, the other being held in March when total sales and installations of ranges amounted to 1,412. The May campaign resulted in 263 more ranges than were obtained in the March campaign.

Public Service Corporation Sales from Leads Show 8.4% Gain

In the first four months of this year there was an increase of 8.4% over the same period last year in number of leads, resulting in sales, turned in by employes not engaged in selling work.

Employes in the Gas Operating Department were first, with a 42.8% increase over the corresponding period in 1936. Electric Operating Department was second with a 22.2% increase. The Commercial Department had a 5.1% increase.

Go Gas for HOT WATER SERVICE
* Enjoy its healthfulness — the pleasure it brings to house-work — turn the spigot and out it gushes, for the morning shower or shave — for dishwashing and cleaning — for use in case of sickness — any sudden demand — day or night.
*New type pilot *More efficient insulation *New burner *Long life boiler *Automatic gas control — bring new economies.
*Our special payment plan makes monthly payments so small you'll hardly miss the money — especially when you consider the health and happiness Automatic Hot Water Service brings to your home.
*GET A Ruud DeSoto AUTOMATIC GAS WATER HEATER
• ILLINOIS IOWA POWER COMPANY •
Formerly named ILLINOIS POWER AND LIGHT CORPORATION

Effective 3 Column Newspaper Water Heater Copy

H. G. Calder Elected to Alabama Utilities Post

H. Gordon Calder, vice-president and treasurer of the Scranton Spring Brook Water Service Co., Chester Water Service Co., Pittsburgh Suburban Water Service Co. and other subsidiaries of the Federal Water Service Corp. at Wilkes-Barre, Pa., has been elected vice-president and treasurer of the Southern Natural Gas Co., Alabama Gas Co. and Alabama Natural Gas Co., it was announced May 26. He will sever his Pennsylvania connections June 10.

Mr. Calder came to Wilkes-Barre from New York four years ago.

Roots-Connersville at Detroit

A. G. Bradbury, Detroit representative of the Roots-Connersville Blower Corp., Connersville, Ind., has established an office at 211 Curtis Bldg. Mr. Bradbury covers the eastern half of Michigan.

The Outstanding Gas Purifying Material » » »

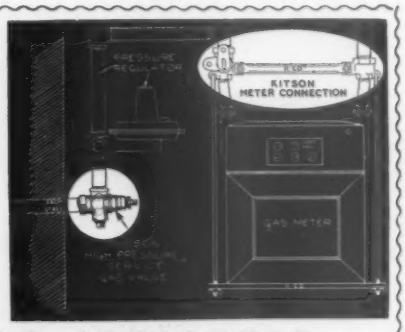
Highest H_2S removal combined with complete removal of traces. Physical structure insures very low box back pressures.

THE RECOGNIZED PURIFYING MATERIAL FOR VAPOR PHASE GUM CONTROL.

Ask for our new bulletins Nos. AL-18-19 which are very interesting

THE ALPHA-LUX COMPANY, Inc.
192 FRONT ST., NEW YORK
Philadelphia **Chicago**

Two



FOR STRICTEST REQUIREMENTS....

KITSON HIGH PRESSURE SERVICE GAS VALVE

This valve is capable of being used on gas pressures up to 125 pounds and it is attached to the service where it enters the basement from the street. Provision is made in the end of the stem and also in the plug for a wire and seal. Thus it eliminates tampering with the valve after it is set.

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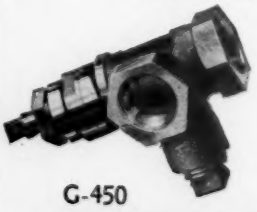

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Eleven "All-Gas" Homes for Chicago Suburb

A row of eleven homes—completely gas equipped—located in the 5800 block on Natoma Avenue, in Norwood Park, is now in the process of construction, and will soon be open to the public for inspection. A winding street, beautifully landscaped, with a park across the way, and all the homes varying in architectural design will make these homes outstanding in that community both from the standpoint of exterior and interior modernity and beauty.

Fitting perfectly with the modern interiors of the homes, which have been appropriately named "ALL COMFORT BLOCK," are to be automatic gas ranges, Electrolux refrigerators in the kitchens. To supply the hundred-and-one hot water needs for the lucky families who will reside in them, automatic water heaters will be installed.

Down in the basements of these homes will be found space enough for recreation rooms to suit the owner's fancy, with cleanliness to keep them habitable all-year round made possible by the custom-built gas warm air furnaces to be installed.

These homes are "small homes", popularly priced, with fine transportation available, in a desirable residential section of the city. All eleven homes will be completed this summer, and construction of similar homes is already under way in other neighborhoods of the city.

Wichita Model Gas Home to Have Unique Features

One of the most unique and outstanding demonstration homes ever constructed in this country is now practically completed in Wichita in the beautiful Forest Hills subdivision in that city. The home is an all-gas talking home, gas being used exclusively for all purposes.

The home actually will talk to visitors and as persons pass from room to room, when it is open for public inspection, the various materials and equipment will explain their own qualities. Loud speakers will be spotted throughout the home and as guests go through the model structure voices will apparently emanate from the different materials and explain their various qualities.

The home is modern in every respect, employing the latest developments in construction and equipment. Announcement of the opening of the home is expected to be made within a short time.

Recently W. R. Phipps, general manager of The Gas Service Company at Wichita, and A. E. Howse, president of the Forest Hill Companies, formulated plans for the opening of the home to the public.

Gas equipment to be used in the home includes an "all gas model kitchen including a modern gas range and an Electrolux, gas designed furnace, automatic gas storage water heater and gas incinerator.

The Wichita Eagle is cooperating in publicising the opening of the new Wichita home, which is expected to be about July 10.

Mrs. Martin Johnson, noted motion picture explorer, stops at the salesrooms of the Consolidated Edison Company, New York, just before sailing for Africa, to take a look at the millionth Servel Electrolux gas refrigerator on display there. This refrigerator is the counterpart of those which Mrs. Johnson and her famous husband, the late Martin Johnson, took with them on the 1935-36 Borneo expedition. In contrast to the millionth gas refrigerator is shown the first Servel Electrolux which was sold in this country just ten years ago by N. T. Sellman, assistant vice-president in charge of sales of Consolidated Edison, when the selling of gas refrigerators was in its pioneering stage.

The two refrigerators in the picture symbolize a decade of progress in gas refrigeration. The millionth refrigerator was completed in the plant of Servel, Inc., at Evansville, Indiana, May 22. The first refrigerator was discovered in the home of Mrs. Ethna M. Agnew, 325 East 72nd Street, New York City, where it was originally installed, and where it had been in constant operation since 1927 when it was first sold.

Appliance Display at Dallas

Gas and its many uses, in the home and in industry today are demonstrated at the Greater Texas and Pan American Exposition in Dallas in an exhibit contracted for on May 18 by the Lone Star Gas System. The Exposition opened June 12 and continues through October 31.

The display is a cooperative project of a large number of nationally known manufacturers of gas appliances—heating, cooking, water heating, refrigerating and air conditioning. Lone Star sponsored the project and directs its activities.

A cooking school and motion picture demonstrations of modern gas appliances are conducted in an auditorium seating several hundred.

The appliance exhibit marks the second project in which Lone Star has participated at the Exposition. The Pan American Hostess House, the former Hall of Religion which was built for the Texas Centennial Exposition in 1936 by Lone Star stockholders, was furnished by Lone Star for the 1937 fair.

The Hostess House serves as a hospitality center for women of Texas and their guests at the Exposition. It not only affords a women's headquarters on the Exposition grounds, but will supply an exclusive and attractive place to receive and fete distinguished women visitors. The auditorium is available to women's groups wishing to hold programs at the Exposition.

Miss Edith Briggs is general secretary of the Pan American Hostess House. The appointment was announced by Frank N. Watson, assistant director general of the Greater Texas and Pan American Exposition.

J. F. Lincoln To Talk Before British Engineering Societies

Mr. J. F. Lincoln, in whose honor was created The James F. Lincoln Arc Welding Foundation, sponsor of the $200,000 Arc Welding Award Program, is in England giving a series of talks at the invitation of various engineering societies and institutes. Groups before whom Mr. Lincoln is scheduled to speak include the South Wales and Monmouthshire Institute of Engineers, the Institute of Engineers and Shipbuilders of Scotland, the Institute of Mechanical Engineers in London, and others. Mr. Lincoln's invitations to speak in England were prompted by growing interest, on the part of British firms and societies, in the application and use of electric welding in manufacture and construction. Mr. Lincoln is Director of Lincoln Electric Company, Ltd., London, England, affiliate of The Lincoln Electric Company, Cleveland, Ohio, of which he is President.

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Portland, Ore., Carries Out Sales Campaign

How members of the Portland Gas & Coke Company organizations can participate in the sales activities of their company was outlined at the two rallies for the launching of the "FOUR ACES OF HOME COMFORT" all gas service sales campaign May 17 and 19 in the Public Service building auditorium.

More than 550 members of the Gas Company organization, their wives and friends attended the two rallies.

"The success of this campaign depends to a large measure on the help which is given us by members of the Gas Company organization," said John J. Winn, Jr., commercial manager, one of the principal speakers.

Cash awards will be paid to members of the Portland Gas & Coke Company organization who participate by turning in leads.

The grand prize for the most leads from which sales were made from May 17 to June 30 for the members of the organization will be a 26-piece Pyrex set of cooking ware. The winner will be determined on the basis of points as listed in the 1937 Opportunity booklet.

All salesmen of Portland Gas & Coke Company, dealers in gas equipment and members of the Gas Company organization participated in the activity.

"The average cost of gas in Portland has dropped 14 per cent since 1933," according to a statement by Paul B. McKee, president.

Total gas used by customers of the Portland Gas & Coke Company in 1937 will be sold for $500,000 less than for the same amount of gas at the average rate prevailing in 1933.

Mr. McKee was the principal speaker at the launching of the activity for residential salesmen, May 18. He stressed the value of "catching all the pitches thrown." Messrs. Winn, Steele, and Elliott presented details of the campaign.

LEON B. EICHENGREEN

Mr. Doherty Honored

Henry L. Doherty, president of the Cities Service Company, on June 10 in Philadelphia received an honorary degree at the fifty-first annual commencement exercises of Temple University.

Besides Mr. Doherty four other prominent men, including Jesse H. Jones of Washington, chairman of the board of the Reconstruction Finance Corporation, received honorary degrees. Mr. Jones delivered the principal address at the commencement exercises.

HENRY L. DOHERTY

L. B. Eichengreen V. P. of Philadelphia Electric Co.

Leon B. Eichengreen was elected a vice-president of the Philadelphia Electric Company at a recent meeting of the Board of Directors. He will be in charge of activities in connection with the gas properties of the company.

Mr. Eichengreen was graduated from the University of Pennsylvania as a mechanical engineer in 1908. He entered the employ of The United Gas Improvement Company in March, 1909, where he held positions, successively, of illuminating engineer, operating engineer and general superintendent of gas operations. He became identified with the Philadelphia Electric Company in August, 1928, as manager of the gas department. Since 1931 he has occupied the position of assistant to the vice-president in charge of engineering, as head of the gas engineering department.

Mr. Eichengreen is a vice-president of the Pennsylvania Gas Association and a member of the Engineers' Club, Penn Athletic Club and St. David's Golf Club. He is a resident of St. David's.

John O. Smith Appointed for Washington Post

John O. Smith, who has accepted an appointment as acting chief, marketing division, National Bituminous Coal Commission, Washington, D. C., has served as a member of the marketing division, Appalachian Coals, Inc., for four years, working under A. L. Brown, manager.

When the General Coal Company was formed in January, 1924, Mr. Smith was appointed Southern sales manager with headquarters in Charlotte, N. C. He served the General Coal Company until he joined the marketing staff of Appalachian Coals, Inc. in 1933.

At Washington, Mr. Smith will supervise the establishment and classification of prices by districts under The Bituminous Coal Act of 1937; also the correlation of prices among the 23 districts to be established throughout the country. He will work under the direction of the National Bituminous Coal Commission, of which the Hon. Charles F. Hosford, Jr. is chairman, and will play an important part in the work of organizing the 23 district boards of code members.

Wisconsin Public Service Elects New Board Members

A. J. Goedjen, division manager and A. C. Carson, chief engineer, both of Green Bay, Wisconsin, have been elected members of the board of directors of the Wisconsin Public Service Corporation, according to J. P. Pulliam, president of the company.

This action follows the plan of increasing the number of directors from five to seven, which was approved by the stockholders at their annual meeting. The new directors were chosen because of their long affiliation with the company in engineering and operating capacities and for their knowledge of the problems affecting the corporation.

Other members of the board of directors are: J. P. Pulliam and C. E. Kohlhepp, Milwaukee; H. C. Cummins and B. F. Braheney, Chicago, and C. R. Phenicie, Green Bay.

J. W. Gates Pres. Alabama Gas Co.

Judson W. Gates, at present division manager of the Mobile Gas Service Corporation, has been transferred to Birmingham as vice-president and general manager of the Alabama Gas Company.

Maurice White, a Mobilian, now the gas company's manager in Montgomery, will go back to Mobile to replace Gates.

The transfer announcements were made after the Federal Securities and Exchange Commission authorized purchase of the Alabama Gas Company's distributing systems by the Southern Natural Gas Company.

Properties in Montgomery, Selma, Anniston, Tuscaloosa, Gadsden and Decatur were acquired by the purchase. The Southern Natural Gas Company also purchased the Huntsville Gas Company.

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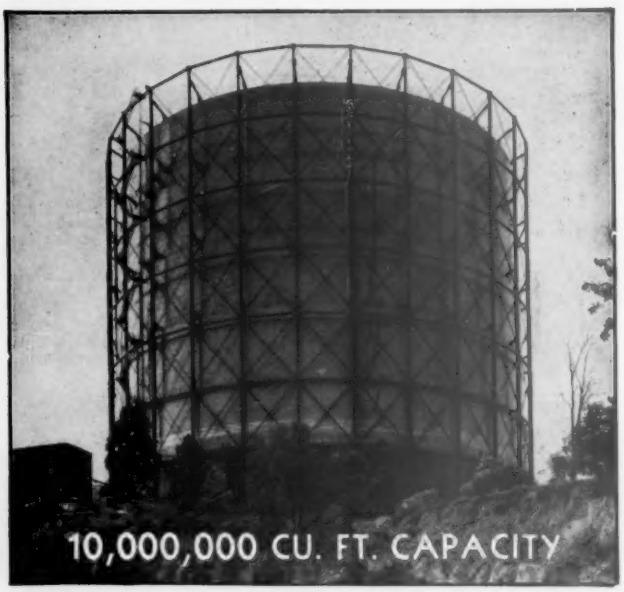

HIGH PRESSURE GAS HOLDERS LOW PRESSURE
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EDITOR, AMERICAN GAS JOURNAL, 53 PARK PLACE, NEW YORK

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American Radiator-Standard Sanitary Opens New Show Rooms

The new combined showrooms of American Radiator and Standard Sanitary Corporation and associated companies, displaying plumbing, heating and air conditioning equipment, were opened on June 9th at 40 to 50 West 40th Street, New York City.

Plumbing, heating and air conditioning contractors were given the first view of the new exhibits in a special preview for the industry. A reception was held from five until seven o'clock presided over by V. Clement Jenkins, President of the Sixth Avenue Association. Among the speakers were Mayor La Guardia, the Hon. Samuel Levy and Ralph T. Walker.

A new technique in presentation is used in American Radiator Company showrooms to tell the story of the biological effects of heating and air conditioning and shows, in combined presentations, the applications of its various products and their relation to personal comfort.

The company's current campaign of "radiant heat" and "personal comfort" is shown in graphic presentations of wall panels that illustrate the radiant heat principle as well as other methods of heat transfer. Heat balance in the human body, illustrating heat supply and heat loss, is shown in an actual size model of a twelve-year-old boy.

In the Standard Sanitary showroom three complete kitchens are shown with equipment selected and arranged for beauty and utility.

Forty feet of photo-murals are used on the walls of the entrance to American Radiator Company's showrooms, depicting all the company's various laboratories devoted to biological study nd development of new equipment. A scale model of the company's Institute of Thermal Research is also shown at the entrance.

Throughout the entire showroom the desire is to make all exhibits serve a dual purpose, that of an aid to the contractor in selling, and that of a technical showroom where the contractor can see and study all the latest equipment in the plumbing, heating and air conditioning field.

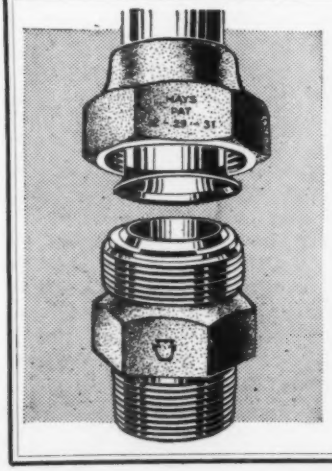
American Gas Products Corporation exhibits their line of gas-fired equipment, including boilers, water heaters, etc.

An exhibition of warm air conditioning equipment is maintained by the Fox Furnace Company.

Part of Gas Exhibit of American Gas Products Corporation Power Plant.

Crisfield Honored by Stevens Institute

The honorary degree of Doctor of Engineering was recently conferred upon J. A. P. Crisfield, president of the Savannah Gas Company, by the Stevens Institute of Technology, from which he graduated with the Class of 1887. In nearly fifty years of continuous service with the Savannah Gas Company, President Crisfield has risen from the position of street main foreman to president.



Gas Tight Copper Pipe Connections

Only Double Seals have 2 planes of contact between copper pipe and fitting (45° plus 90°). Use Double Seals wherever strong, air tight, vibration—bend—twist—pull proof connections are desired. Test data to prove the mechanical strength of Double Seals are available.

Write for Cat.

Hays Mfg. Co., Erie, Pa.

With Delco

Harry E. Thompson, gas product engineer, formerly with A.G.A. Testing Laboratories and the General Gas Light Co. of Kalamazoo, has been appointed gas sales engineer for Delco Frigidaire Conditioning Division of General Motors Sales Corporation, Dayton, Ohio, specializing in Delco heating equipment.

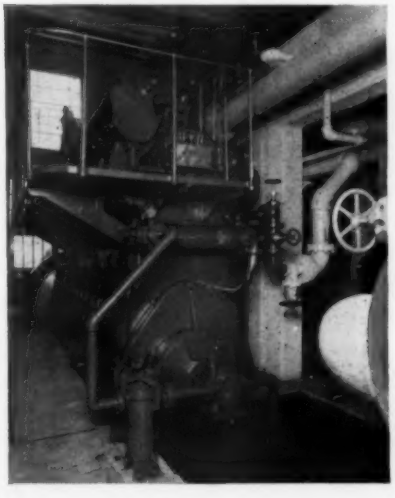
William H. Feller Named Secretary

The board of directors of Public Service Corporation of New Jersey at a meeting, May 18, appointed William H. Feller secretary of the Corporation, succeeding Charles M. Breder, who died April 28. Mr. Feller had been assistant secretary since 1917. The board also appointed G. Harry Litterst and J. Irving Kibbe assistant secretaries. All three had been appointed to similar positions in the subsidiary operating companies a week previous. William T. Crudge, who has been assistant secretary of the Corporation and subsidiary companies since 1920, continues in that position.

Gas-Electric Generator on State Farm

The Texas State Farm Industries near Sugarland, Texas, have their own gas-electric generator to supply current for all uses of electricity on the State Farms of several thousand acres. The prime mover by which this generator is driven is a gas engine operated with prison labor. A steam engine was formerly used but was displaced in 1935.

Light, power, and refrigeration are all supplied from the one source. Within the prison enclosure, always brilliantly illuminated at night, are a group of buildings which include a packing house, a cannery, and a warehouse, besides necessary housing for the inmates. Outside the enclosure are cotton gins, a brick plant, and other operations requiring light and power, the farthest point to which current is transmitted being two miles from the power plant.



Gas engine—Cooper-Bessemer Type LR-6—in power house of Texas State Farm Industries, Sugarland, Texas.

The power unit employed is a Cooper-Bessemer gas engine with 600 rated horsepower at 277 revolutions per minute, direct-connected to a 2300-volt AC generator. The actual power developed by this engine on a water-brake test at rated speed, the manufacturers report, was 743 B.H.P.

H. M. Mansfield Made President of Barber Burner

At a meeting of the Directors of The Barber Gas Burner Company, Cleveland, on June 5, 1937, Harry M. Mansfield, formerly Secretary of the Company, was elected President. Mr. Mansfield succeeds to the position left vacant by the death of Mr. Harry E. Kerr.

H. M. MANSFIELD

New Benzol Refining Plant

A contract for what will be the world's largest benzol refining plant has been awarded by the Carnegie-Illinois Steel Corporation to the Semet-Solvay Engineering Corporation, of New York, to be erected at Clairton, Pa.

The new project will be a complete, modern unit, employing the continuous refining process, perfected over 15 years of operation by the Semet-Solvay Company at its Syracuse, N. Y. plant.

The light oils recovered from the by-product coke ovens will be processed in the new equipment to obtain benzol, toluol, xylol, solvent naphtha, and residues to meet the strict specifications required by the industries using these products.

Lycoming Distributor

The Moorlane Company, 409 Archer Street, Tulsa, has been appointed distributor for Lycoming Natural Gas engines and Lycoming Natural Gas Engine generating units for the Tulsa Territory according to an announcement by the Lycoming Manufacturing Company.

Lycoming's natural gas engines are for oil well pumping, driving rotary and power pumps and for generating electric light and power. They are of the heavy duty type available in four, six and eight-cylinder models of which a majority of the parts of the three models are interchangeable.

Crane Co. Consolidates Sales Depts.

P. R. Mork, vice president in charge of sales, Crane Co., Chicago, announces the co-ordination of all activities concerned with the estimating, engineering, or sales of valves, fittings, pipe, and fabricated piping into one unit, the Valve and Fitting Department, with Mr. W. H. Pape as manager. Mr. Pape enters his new position with 25 years' experience covering a wide range of industrial applications of Crane products. In 1914 he entered the oil industry serving subsequently as designer, operator, and sales engineer. He joined the Crane organization in 1927 as special representative in New York and later in the Boston territory. For 6 years he was in the Oklahoma and Gulf Coast oil fields, and for the past 1½ years has been manager of the Oil Sales Department in the general office, Chicago.

Penn Electric Switch Appoints R. H. Luscombe Sales Manager

Robert H. Luscombe was named sales manager of Penn Electric Switch Co., Des Moines, effective June 1, according to an announcement recently released by Malcolm E. Henning, executive vice-president of the company.

Mr. Luscombe has been connected with Penn Electric for three years, first in charge of sales to the gas heating industry and to accessories jobbers and distributors and more recently as manager of the company's New York branch office. He will continue to direct activities of the company's New York branch until Penn Electric completes the move to its new plant and office at Goshen, Indiana, at which time he will take over active sales management duties at the factory for both domestic and foreign sales.

INDUSTRIAL GAS BOILERS

Tubular or Flueless

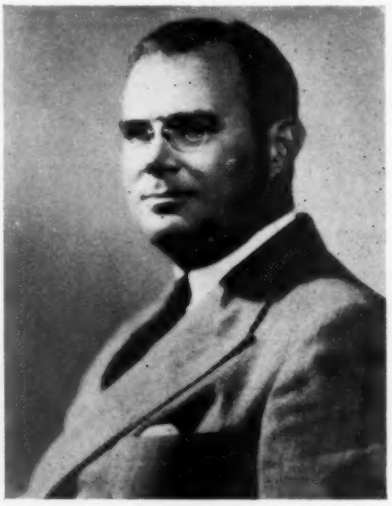
¾ to 45 H.P.

P. M. LATTNER MFG. COMPANY

CEDAR RAPIDS, IOWA

D. C. Bakewell with Blaw-Knox

Donald C. Bakewell has resigned as vice president and chairman of the executive committee of the Continental Roll and Steel Foundry Company, in which capacity he has served since 1930, to become special representative of the Blaw-Knox Company. He will make his headquarters in the executive offices at Pittsburgh.



DONALD C. BAKEWELL

Mr. Bakewell is vice president and member of the executive committee of the Illinois Zinc Company, director of E. H. Jennings Bros. Company, director of the Coraopolis Trust Company, member of American Iron & Steel Institute, member of the advisory committee of the American Foundrymen's Association and director and member of the executive committee of the Steel Founders Society of America.

Minneapolis-Honeywell Appointments

E. B. Evleth, affiliated with the Minneapolis-Honeywell Regulator Company for twelve years, has been appointed vice-president and general manager of the Brown Instrument Company, a division of Minneapolis-Honeywell in Philadelphia.

Mr. Evleth succeeded William J. Hajek who has taken a six months' leave of absence before resumption of active duties in an executive capacity with the Minneapolis office of Minneapolis-Honeywell.

C. L. Saunders, former regional sales manager at Chicago, has been appointed to succeed Mr. Evleth as resident vice-president in charge of the Midwest region for the Minneapolis-Honeywell Company.

Charles C. Cochran, formerly of the Milwaukee office, has been transferred to Chicago to assist Mr. Saunders in all non-industrial sales activities throughout the entire midwest region of Minneapolis-Honeywell. John B. Banks has been transferred from Chicago to Milwaukee as district branch manager. O. B. Wilson, who has been manager of the industrial division of the Chicago office, will extend his activities over the entire midwest region.

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Rate Development **Valuations** **Reports**
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SALES POSITION WANTED
Sales Engineer: Sixteen years of gas company experience selling industrial, commercial and space heating equipment. Would like to represent either a progressive utility or manufacturer.
Address Box 103, AMERICAN GAS JOURNAL, 53 Park Place, New York City.

WANTED
ANY QUANTITY OF
GAS RETORT CARBON
FOR PROMPT AND LATER DELIVERY
Address Box 104 c/o American Gas Journal
53 PARK PLACE **NEW YORK**

IMPROVED EQUIPMENT — RUSSELL ENGINEERING
Coal Gas Plants—Horizontal Ovens, Benches, Refills, Additions, Repairs, Charging and Discharging Machines
DIVISION OF
COMBUSTION UTILITIES CORPORATION
24 STATE STREET
NEW YORK
Oil Gas Plants—"Refractory Screen" Process for Base—Standby or Peak Loads—On Existing or New Water Gas Sets Low or High B.T.U. Gas

(Continued from page 42)

plumber and the others, but in the minds of the public must be firmly fixed the feeling that only by the use of proper gas appliances can those results be obtained that will contribute to good food, good refrigeration, a comfortable home and the priceless asset of automatic hot water. Get the good will of the architects, realtors and builders, but be sure that imparted through direct salesmanship and through advertising in your broad merchandising, in the minds of the public, is a respect for and confidence in gas appliances furnished by the utility companies.

The mystery chef, attractive direct mail advertising, newspapers, magazines,—all must play their part in merchandising today, but the real job, the order closing, the priceless word-of-mouth advertising must be through a highly organized, thoroughly trained, enthusiastic sales force.

Resale price maintenance laws in 33 States have followed a favorable Supreme Court decision of last December. Increased sales of private brands, undoubtedly extending to gas equipment, have followed this price maintenance arrangement, bringing out further the need of promoting the best equipment that will secure the greatest consumer satisfaction. That is just one of the many things that I would like to stress as establishing the necessity for thorough training of salesmen.

I recommend the study of modern methods, I recommend the study of the very strong and convincing direct mail advertising used by Public Service Corporation and that used by Pontiac Motor Car Company. Pontiac contemplates using five million pieces of direct mail in 1937.

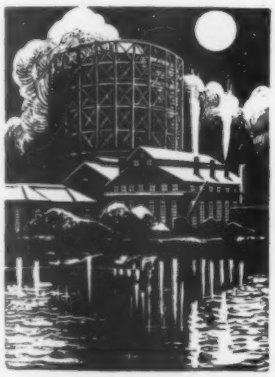
I recommend a study of the subject of sales films as a means of training men to carry the gospel of gas to old friends and new ones. I recommend a study of the commercial trailer which permits on the scene demonstrations of installed equipment. This trailer idea has been effectively used by General Electric, Norge, Quiet May, Westinghouse and others. Why not gas? I recommend a careful study of the very evident picture-mindedness and ear-mindedness of people as demonstrated by many things and as covered in recent writings by Bruce Barton and others.

I recommend *objective* rather than *subjective* selling. I hate smart use of language and I think everybody knows exactly what I mean by that. What objective selling means is simply that we must think entirely in terms of the happiness, comfort and satisfaction of the consumer and not in terms of the dividends of the gas company or commission or salary of the salesmen. The average retailer doesn't care whether he sells equipment for the use of oil, coal, electricity or what have you. It is vitally important that old friends, now using gas, shall be made to keep their enthusiasm for gas by having the right appliances functioning properly and that those who are building homes shall purchase gas appliances and not some substitute.

"I recommend 'objective' rather than 'subjective' selling . . . by objective I mean thinking entirely in terms of the happiness, comfort and satisfaction of the consumer."

You are talking to a procession and not to an audience. Because your people know the advantages of your product or because certain features were covered in your advertising last year doesn't mean that there is nothing for you to do this year. What you did in 1936 does not mean that you have a thoroughly understanding public in 1937. Because you are talking to a procession, every new day requires that the gospel of good service, proper installation, perfect gas appliances must be preached through advertising and through personal contact every day and that it is of primary importance to hold the loyalty and to build up the interest and friendship of every old customer.

About midway in the remarks to which you have listened so patiently, I wanted to inject one other short statement. I decided, however, to wait until now and give it to you as my farewell thought. I started life as a newspaper man, went from there to become the advertising manager of a corporation, from that job to agency work, and ultimately, nearly thirty years ago, to my present company. I have devoted most of my adult life to presenting to business men all over the world the vital, worth-whileness of Friendly Advertising, of building good will through beautiful, colorful reproductions of great pictures combined with a calendar pad and an artistic mounting, to place the sign and the message of the merchant, the manufacturer, the broker, the banker upon the walls of homes and offices and factories.



Because you are addressing a parade and not an audience, a calendar properly designed is a splendid means of advertising your advertising. If the calendar is properly made, if it is tuned to the times and has deep human interest appeal, it will surely reach the wall for which it was intended, and it will stay there throughout a year, telling its story. The gas company finds what is known as a kitchen calendar with perhaps a recipe or cook-book pad one of its most effective means of selling gas and selling appliances.

This is a message out of my experience and I would be disloyal to the ideals I endeavor to demonstrate if I didn't present it to you. Pennsylvania Railroad Company, the Standard Oil Company, Westinghouse, General Electric, and thousands of other business houses, great and small, wherever the sun shines, find that a calendar properly designed and properly distributed is a vital force in a sound advertising campaign.

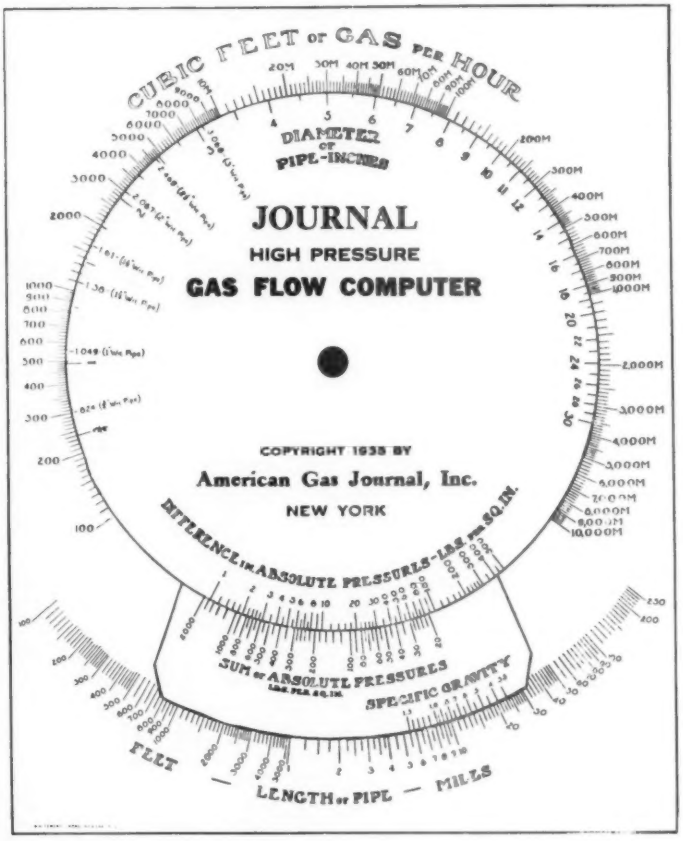
INTERNATIONAL GAS UNION

Third Congress

At the meeting of the International Gas Union held in Paris (France) June 12-16, the reports of the several standing committees, on which the American Gas Association is represented, were presented. Alexander Forward, Managing Director, represented the American Gas Association. Major Forward writes that "the printed reports are interesting and usually conclude with the statement each country must fill in the gaps to suit its own situation."

The report of the Committee on Gas Tariffs, Fritz Escher (Zurich) Switzerland, Chairman, G. I. Vincent (Syracuse, N. Y.) American Gas Association representative says, "it seems the last word has been said, and the three thousand odd tariffs in the United States do not leave to the imagination much scope for creating new ones."

"Journal" Gas Flow Computers



New Improved Gas Flow Computers now available of durable celluloid, encased in a convenient leatherette cover with complete instructions.

Actual Size 6¼ x 7½

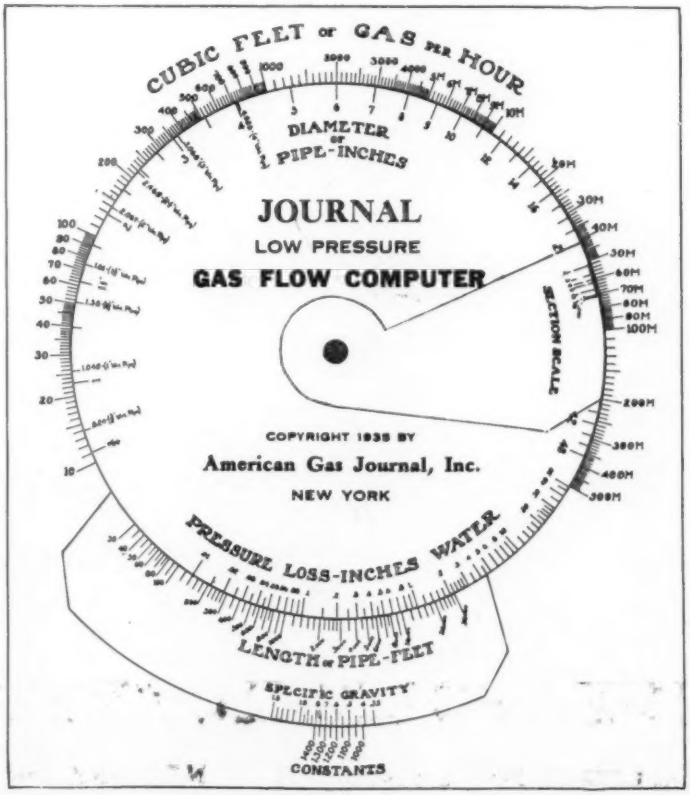
High Pressure Computer Range:

Cu. Ft. of Gas Per Hour—100-10,000 M
Diameter of Pipe Inches ¾-30
Difference in Absolute Pressure—Lbs. per sq. in. 1-500
Sum of Absolute Pressures—Lbs. per sq. in 2000-20
Specific Gravity 1.5-.35
Length of Pipe—Feet 100-5000
Length of Pipe—Miles 1-250

Low Pressure Computer Range:

Cu. Ft. of Gas Per Hour—10 to 500 M
Pipe Diameter ¾" to 48" (including standard and actual weight up to 4")
Pressure Loss Inches .01-10.
Length of Pipe—Feet 30-30,000
Specific Gravity 1.5-.35
Constants 1400-1000

Price $3.50 Each, Postage Prepaid



AMERICAN GAS JOURNAL
53 Park Place, New York

Please enter our order for Computers as follows at $3.50 each, postage prepaid

....HIGH Pressure Computer

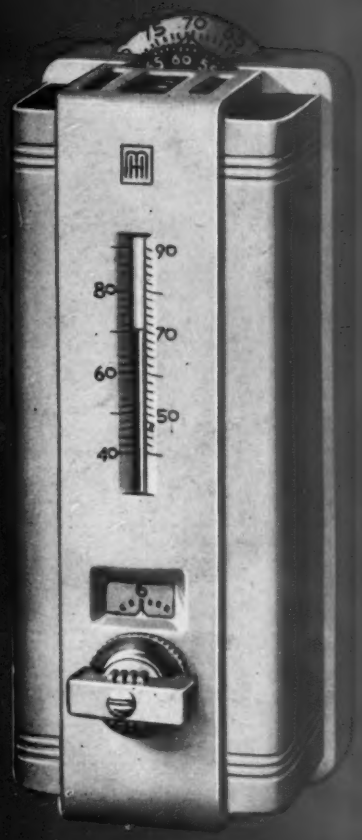
....LOW Pressure Computer

NAME .....

ADDRESS .....

Da-Nite Acratherm LISTS at...

only $10 more



GIVE YOUR CUSTOMERS THE ADVANTAGE OF LOWERED NIGHT TEMPERATURE AND AUTOMATIC MORNING PICKUP . . . .

● The new Minneapolis-Honeywell Da-Nite Acratherm is the only control that offers, in one instrument, the economy of manually lowered temperature with automatic return, and the accuracy of control provided by the exclusive M-H Heat Acceleration principle. Yet it costs your customers only $10.00 more than the Acratherm. They benefit by increased satisfaction with automatic heat. You make an extra profit. So recommend and install the Da-Nite Acratherm. Minneapolis-Honeywell Regulator Company, 408 East Twenty-Eighth St., Minneapolis, Minnesota.

NEAPOLIS-HONEYWELL *Control Systems*

DUSTRIAL INSTRUMENTS • NATIONAL PNEUMATIC CONTROLS